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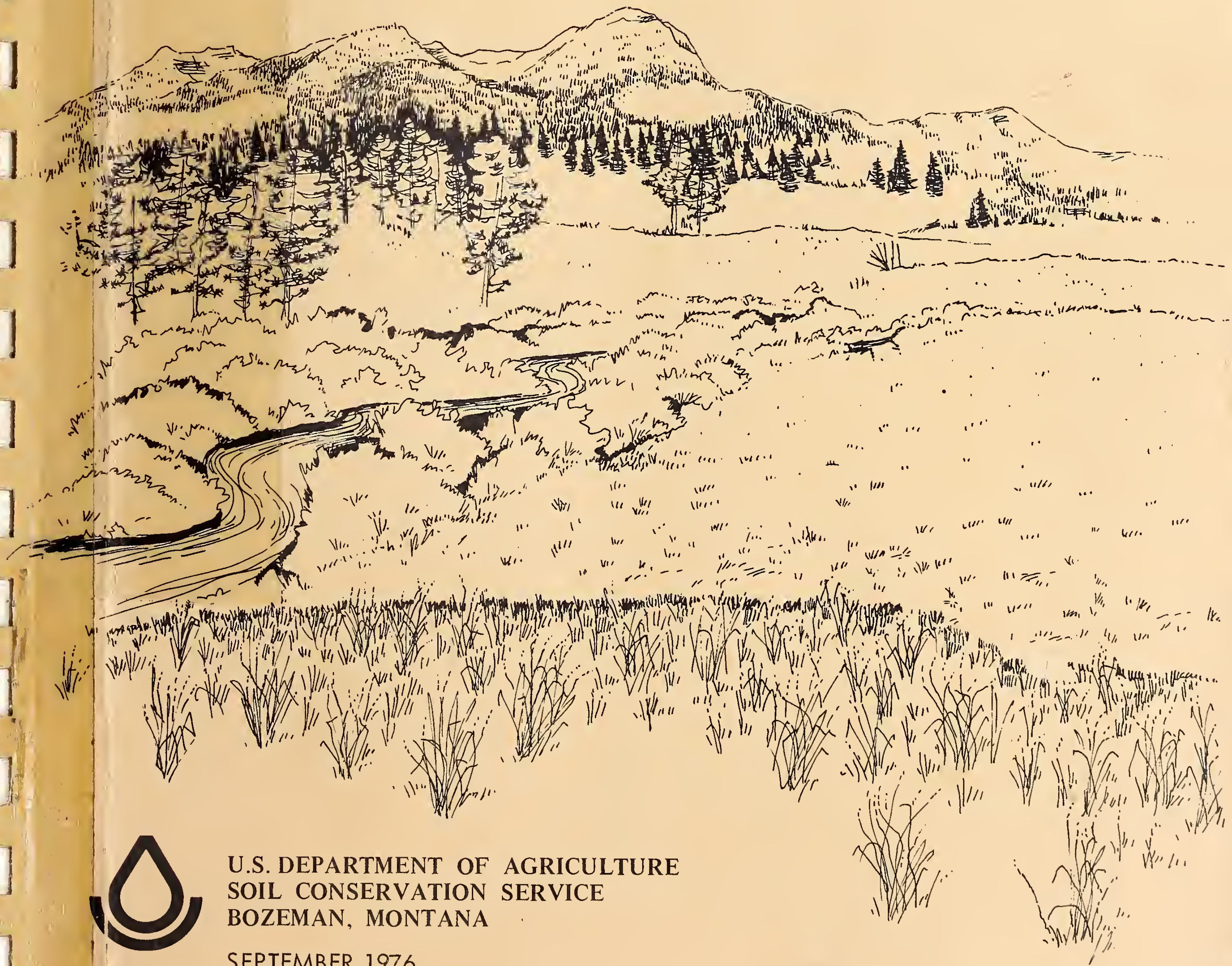
Climax Vegetation of Montana

Based on Soils and Climate



U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOZEMAN, MONTANA

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CLIMAX VEGETATION OF MONTANA

BASED ON SOILS AND CLIMATE

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By

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Harold E. Hunter, State Woodland Conservationist

Soil Conservation Service

U. S. Department of Agriculture
Soil Conservation Service
Bozeman, Montana
June, 1976

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PREFACE

Successful range and forest resource management are dependent upon an understanding of the potential natural plant community that might be expected in normal years from a given soil and climate. The potential is dependent upon interrelationships of soil, vegetation, climate, physiography, and the biota common to the site.

Climax plant communities are recognized as being ecological standards used in monitoring natural ecosystems.

Many areas remain in Montana where the vegetation has been little changed by man's activities. Through the years, U. S. Soil Conservation Service personnel have made detailed studies of the soil, climate, and vegetation on near-pristine areas of grassland in Montana. Data thus obtained have been used to develop lists of dominant plant species in climax grassland plant communities. In developing plant community descriptions for the forested mapping units, species composition of habitat types recorded by the U. S. Forest Service in Forest Habitat Types of Montana were helpful.

This publication is an effort to categorize on a broad scale geographic areas, average annual precipitation, groups of soils with similar characteristics, and the corresponding natural plant communities.

Climax vegetation is not necessarily the goal of range or forest management. However, it is an ecological benchmark on which range condition and range and forest resource management can be based. The better the natural ecosystem is understood, the more specific resource management techniques can be.

Van K Haderlie
State Conservationist
U. S. Soil Conservation Service

CLIMAX VEGETATION OF MONTANA
BASED ON SOILS AND CLIMATE

By

Robert L. Ross, State Range Conservationist
Harold E. Hunter, State Woodland Conservationist

Soil Conservation Service

Soil and climate are two major factors that determine the kind and/or amount of climax (natural) vegetation.

A specific soil or group of soils with similar characteristics in a given climate through thousands of years develops a typical plant community which fully utilizes the production factors of the site. A climax plant community is defined as the highest ecological development capable of perpetuation under the prevailing climatic and edaphic condtions. 1/ In the absence of disturbance or physical deterioration, a site in climax condition supports a native plant community that is typified by a distinct kind and/or amount of vegetation which differs from any other site. Under climax condition, the amount of each species within the kind of vegetation will vary over time and space but is as permanent as the site.

Once the soil and climate have been identified, the climax plant community can be predicted even though the vegetation has deviated from climax. Conversely, on grasslands, soil and climate cannot be accurately predicted from species composition alone because of influencing factors such as grazing, insects, fire, or other disturbances. As ecological range condition declines, it becomes increasingly difficult and finally impossible to identify a site by vegetation. Consequently, in the absence of the original kind and amount of grassland plant cover, the permanent features of the site, the soil and climate, must be used as the identifying criteria.

The Climax Vegetation Map is based on soils and climate. The soils are grouped by geographic areas and annual precipitation zones.

Soil association maps developed by the U. S. Soil Conservation Service and Montana State University provided the basis for soil information.

The geographic areas are based on the Geologic Map of Montana. They are a refined version of those used by the Soil Conservation Service for Technician's Guide to Range Condition Classes.

1/ Glossary of Terms Used in Range Management. Published by the Society for Range Management, 1974.

Annual precipitation figures are from precipitation maps based on data compiled by the Soil Conservation Service Snow Survey and Water Supply Forecast Unit.

Forested area delineations are based on the U. S. Army Map Service quadrangle maps, Earth Resources Technology Satellite aerial photographic mosaics, and on-site field examination.

A range site is a complex of soil and climate that has the capability of producing consistent quantities and/or species of climax vegetation. E. J. Dyksterhuis 2/ amplified this definition as follows:

> Range sites are embodied with those areas where the soils and climatic environment sustain natural grass, forb, and shrub communities. Variation in soil (texture, depth, and permeability) and climate (precipitation, elevation, temperature, and exposure) determine measurable and important differences in the kind and/or amount of the climax vegetation. Each specific complex of soil and climatic conditions is called a range site.

Forested areas are not designated by range sites. In order to fully designate a range site, a soil-group name is combined with the precipitation zone and geographic location. The range sites are described as follows.

Wetland--Land where seepage, ponding, etc., raises the water table to above the surface during only a part of the growing season. Too wet for cultivated crops but too dry for common reeds, cattails, or true aquatics.

Subirrigated--Land with an effective subsurface ground water table and water rarely over the surface during the growing season.

Saline Lowland--Subirrigated and overflow lands where salt and/or alkali accumulations are apparent and salt tolerant plants occur over a major part of the area.

Sands--Sands and loamy sands more than 20 inches deep.

Sandy--Coarse to fine sandy loams more than 20 inches deep.

Silty--Soils more than 20 inches deep of very fine sandy loam, loam, or silt loam. This includes soils with two inches or more loam or silt loam over clayey subsoils.

Clayey--Granular clay loam, silty clay loam, silty clay, sandy clay, or clay more than 20 inches deep.

2/ Dyksterhuis, E. J., Dr. Condition and Management of Rangeland Based on Quantitative Ecology. Journal of Range Management, 1949.

Limy--Soils more than 20 inches deep that are nearly white and very limy (15 percent or more calcium carbonate) within four inches of the surface.

Shallow Clay--Shallow granular clay soils that are 10 to 20 inches deep to underlying shale or nearly impervious clays.

Shallow--Soils 10 to 20 inches deep to hard rock or soft beds of decomposed granite, siltstone, or sandstone. Few roots penetrate deeper than 20 inches.

Riverbreaks--Mixed soils of various depths and textures on steep irregular slopes. Trees may occur in association with shale outcroppings.

Dense Clay--Relatively impervious, deep, nongranular clays--may be overlain by thin, ineffectual layers of other materials. The dispersed layer is very hard to extremely hard when dry and very sticky when wet.

Very Shallow--Areas where few roots can penetrate deeper than 10 inches. Outcropping of gravel or bedrock is characteristic. Joints in bedrock may develop deep soil pockets usually marked by tall grasses, shrubs, or stunted trees.

Saline Upland--Upland soils more than 20 inches deep with salt and/or alkali accumulations. Salt tolerant plants occur over a major part of the area.

Badlands--A complex of nearly barren lands broken by drainages intermingled with small grazable areas.

Not having a previously developed system of site identification based on soils and climate for the forested lands, a system had to be developed. The basis for defining the mapping units were areas within which the aspect, elevational, soil, and physiographic relationships of the climax overstory tree vegetation were reasonably consistent. The mapping unit definition was developed as a brief generalization of soil properties unique to each unit and soil-parent material-physiographic relationships.

Plant species for each mapping unit are listed in order of dominance as they occur in the plant community. Grassland and forest understory are described in terms of average relative plant composition by weight. Forest overstory is described by relative canopy cover. Plant names are in accordance with the Soil Conservation Service publication "Standardized Plant Names for Montana."

It must be recognized that an inventory of soil, annual precipitation, and vegetation delineated at the small scale of the attached map is very general. Within the delineations, there may be inclusions and complexes that actually exist but are too small to be shown at the given scale.

An inventory such as this is most efficiently used for broad resource planning. Detailed land use planning and treatment should be based on a more detailed on-site inventory and investigation.

It is hoped that suggested changes or refinement in map delineations or species composition noted by field examination will be brought to the attention of the authors.

CLIMAX VEGETATION OF MONTANA
BASED ON SOILS AND CLIMATE

EASTERN GLACIATED PLAINS:

1. Silty Range Site, 10-14" Precipitation Zone (P. Z.)

Dominants in the Climax Vegetation*	Plants that Increase with Grazing Pressure**
Needleandthread	Blue grama
Western and thickspike wheatgrass	Needleandthread
Green needlegrass	Sandberg bluegrass
Little bluestem	Prairie junegrass
Prairie junegrass	Threadleaf sedge
Porcupinegrass	Silver sagebrush
Blue grama	Clubmoss
Native legumes	Fringed sagewort
Silver sagebrush	Other weedy forbs
Western snowberry	Annuals
Winterfat	Plains pricklypear

2. Silty-Clayey Range Site Complex, 10-14" P. Z.

Silty: Same as Site No. 1

Clayey: Same as Site No. 3

3. Clayey and Shallow Clay Range Site Association, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Sandberg bluegrass
Green needlegrass	Blue grama
Little bluestem	Prairie junegrass
Prairie junegrass	Plains reedgrass
Plains reedgrass	Silver sagebrush
Biscuitroot	Fringed sagewort
Milkvetch	Curlycup gumweed
American vetch	Eriogonum
Silver sagebrush	Biscuitroot
Winterfat	Onion
	Other weedy forbs
	Annuals
	Plains pricklypear

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*Listed in approximate order of dominance

**Based primarily on response to grazing pressure by cattle

4. Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P. Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Silver sagebrush
Green needlegrass	Big sagebrush
Prairie junegrass	Prairie junegrass
Big sagebrush	Sandberg bluegrass
Nuttall saltbush	Golden pea
Greasewood	Curlycup gumweed
	Eriogonum
	Annuals

Clayey: Same as Site No. 3

Saline Upland:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Alkali sacaton	Greasewood
Western and thickspike wheatgrass	Inland saltgrass
Greasewood	Big sagebrush
Nuttall saltbush	Rabbitbrush
Inland saltgrass	Sandberg bluegrass
Bottlebrush squirreltail	Bottlebrush squirreltail
Sandberg bluegrass	Foxtail barley
	Plains pricklypear
	Tumblegrass
	Other weedy forbs
	Annuals

5. Saline Lowland Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Inland saltgrass
Alkali sacaton	Greasewood
Alkali cordgrass	Foxtail barley
Slender wheatgrass	Bottlebrush squirreltail
Nuttall alkaligrass	Tumblegrass
Inland saltgrass	Poverty sumpweed
Canada wildrye	Belvedere summercypress
Sedge	Other weedy forbs
Greasewood	Annuals
Nuttall saltbush	Rabbitbrush

6. Sands and Sandy Range Site Association, 10-14" P. Z.

Sands:

Dominants in the Climax Vegetation

- Prairie sandreed
- Needleandthread
- Indian ricegrass
- Little bluestem
- Sand bluestem
- Sun sedge
- Native legumes
- Skunkbush sumac

Plants that Increase with Grazing Pressure

- Needleandthread
- Threadleaf sedge
- Sand dropseed
- Scurfpea
- Green sagewort
- Fringed sagewort
- Field sagewort
- Cudweed sagewort
- American licorice
- Other weedy forbs
- Plains pricklypear

Sandy:

Dominants in the Climax Vegetation

- Needleandthread
- Prairie sandreed
- Threadleaf sedge
- Little bluestem
- Sideoats grama
- Western and thickspike wheatgrass
- Native legumes
- Blue grama
- Skunkbush sumac
- Rose

Plants that Increase with Grazing Pressure

- Threadleaf sedge
- Blue grama
- Needleandthread
- Sand dropseed
- Red threeawn
- Fringed sagewort
- Scurfpea
- Other weedy forbs
- Rose
- Annuals
- Plains pricklypear

WESTERN GLACIATED PLAINS:

7. Silty Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation

- Needleandthread
- Western and thickspike wheatgrass
- Green needlegrass
- Bluebunch wheatgrass
- Basin wildrye
- Prairie junegrass

Plants that Increase with Grazing Pressure

- Blue grama
- Needleandthread
- Sandberg bluegrass
- Threadleaf sedge
- Hairy goldenaster
- Golden pea
- Fringed sagewort

7. Silty Range Site (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Native legumes	Other weedy forbs
Silver sagebrush	Big sagebrush
Blue grama	Rabbitbrush
	Broom snakeweed
	Plains pricklypear
	Clubmoss

8. Silty-Clayey Range Site Complex, 10-14" P. Z.

Silty: Same as Site No. 7

Clayey: Same as Site No. 9

9. Clayey and Shallow Clay Range Site Association, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Green needlegrass	Prairie junegrass
Western and thickspike wheatgrass	Sandberg bluegrass
Bluebunch wheatgrass	Plains reedgrass
Needleandthread	Blue grama
Prairie junegrass	Eriogonum
Plains reedgrass	Western yarrow
Milkvetch	Fringed sagewort
Scarlet globemallow	Curlycup gumweed
Winterfat	Biscuitroot
*Prairie sandreed	Onion
	Other weedy forbs
	Annuals
	Broom snakeweed
	Rabbitbrush

*Growing on fractured shale outcrops

10. Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P. Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Prairie junegrass
Basin wildrye	Sandberg bluegrass
	Golden pea

10. Dense Clay: (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Prairie junegrass	Curlycup gumweed
Nuttall saltbush	Eriogonum
Greasewood	Other weedy forbs
	Plains pricklypear
	Annuals

Clayey: Same as Site No. 9

Saline Upland:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Alkali sacaton	Greasewood
Western and thickspike wheatgrass	Inland saltgrass
Greasewood	Big sagebrush
Basin wildrye	Sandberg bluegrass
Nuttall saltbush	Bottlebrush squirreltail
Inland saltbush	Rabbitbrush
Bottlebrush squirreltail	Other weedy forbs
Sandberg bluegrass	Annuals
	Plains pricklypear

11. Saline Lowland Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation	Planta that Increase with Grazing Pressure
Alkali sacaton	Inland saltgrass
Western and thickspike wheatgrass	Greasewood
Nuttall alkaligrass	Silver buffaloberry
Alkali cordgrass	Scratchgrass
Slender wheatgrass	Foxtail barley
Inland saltgrass	Bottlebrush squirreltail
Sedge	Silverberry
Greasewood	Poverty sumpweed
Nuttall saltbush	Belvedere summercypress
	Other weedy forbs
	Annuals

12. Sands and Sandy Range Site Association, 10-14" P. Z.

Sands:

12. Sands: (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Prairie sandreed	Needleandthread
Needleandthread	Threadleaf sedge
Indian ricegrass	Sand dropseed
Threadleaf sedge	Fringed sagewort
Native legumes	Scurfpea
Yucca	American licorice
Skunkbush sumac	Other weedy frobs
	Annuals
	Rose
	Silver sagebrush

Sandy:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Needleandthread	Threadleaf sedge
Prairie sandreed	Needleandthread
Threadleaf sedge	Blue grama
*Bluebunch wheatgrass	Red threeawn
Western and thickspike wheatgrass	Sand dropseed
Native legumes	Fringed sagewort
Skunkbush sumac	Cudweed sagewort
Blue grama	Other weedy forbs
	Annuals
	Rose
	Plains pricklypear

*More dominant in western part of Western Glaciated Plains

13. Subirrigated and Wetland Range Site Association

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Tall reedgrasses	Kentucky bluegrass
Tufted hairgrass	Redtop
Slender and bearded wheatgrass	Low sedges
Northern mannagrass	Baltic rush
Prairie cordgrass	Foxtail barley
Tall sedges	Meadow barley
Basin wildrye	Horsetail
Canada wildrye	Golden pea
Willows	Iris
	Cinquefoil forbs

13. Subirrigated and Wetland Range Site Association (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Cottonwood	Thistles
Boxelder	Other weedy forbs
	Shrubby cinquefoil
	Annuals

EASTERN SEDIMENTARY PLAINS:

14. Silty Range Site, 10-14" P. Z.

(Includes thin breaks too small or irregular to delineate)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Blue grama
	Needleandthread
Little bluestem	Threadleaf sedge
Needleandthread	Sandberg bluegrass
Green needlegrass	Prairie junegrass
Bluebunch wheatgrass	Silver sagebrush
Big bluestem	Fringed sagewort
Prairie junegrass	Hairy goldenaster
Threadleaf sedge	Western yarrow
Native legumes	Pussytoes
Silver sagebrush	Other weedy forbs
Skunkbush sumac	Annuals
Winterfat	Western snowberry
Blue grama	Broom snakeweed
Western snowberry	Plains pricklypear

15. Silty Range Site, 15-19" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Needleandthread
	Prairie junegrass
Green needlegrass	Sandberg bluegrass
Little bluestem	Idaho fescue
Big bluestem	Western and thickspike wheatgrass
Bluebunch wheatgrass	
Idaho fescue	Lupine
Sideoats grama	Scurfpea
Native legumes	Milkvetch
Needleandthread	Hairy goldenaster
Prairie junegrass	Cinquefoil forbs

15. Silty Range Site (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Silver sagebrush	Cudweed sagewort
	Other weedy forbs
	Silver sagebrush
	Big sagebrush
	Annuals

16. Silty-Clayey Range Site Complex, 10-14" P. Z.

(Includes thin breaks too small or irregular to delineate)

Silty: Same as Site No. 14

Clayey: Same as Site No. 18

17. Silty-Clayey Range Site Complex, 15-19" P. Z.

Silty: Same as Site No. 15

Clayey: Same as Site No. 19

18. Clayey and Shallow Clay Range Site Association, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Blue grama
Green needlegrass	Sandberg bluegrass
Little bluestem	Prairie junegrass
Bluebunch wheatgrass	Plains reedgrass
Prairie junegrass	Buffalograss
*Prairie sandreed	Curlycup gumweed
Native legumes	Golden pea
Big sagebrush	Biscuitroot
Nuttall saltbush	Onion
Winterfat	Other weedy forbs
	Big sagebrush
	Broom snakeweed
	Annuals

*Growing on fractured shale outcrops

19. Clayey and Shallow Clay Range Site Association, 15-19" P. Z.

19. Clayey and Shallow Clay Range Site Association (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Green needlegrass	Prairie junegrass
Western and thickspike wheatgrass	Sandberg bluegrass
Bluebunch wheatgrass	Idaho fescue
Basin wildrye	Big sagebrush
Big bluestem	Golden pea
Little bluestem	Lupine
Idaho fescue	Balsamroot
Prairie junegrass	Curlycup gumweed
*Prairie sandreed	Onion
Native legumes	Eriogonum
Big sagebrush	Other weedy forbs
Nuttall saltbush	Broom snakeweed
Winterfat	Annuals

*Growing on fractured shale outcrops

20. Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P. Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Prairie junegrass
Basin wildrye	Sandberg bluegrass
Big sagebrush	Golden pea
Nuttall saltbush	Curlycup gumweed
Greasewood	Eriogonum
Prairie junegrass	Annuals

Clayey: Same as Site No. 18

Saline Upland:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Alkali sacaton	Inland saltgrass
Western and thickspike wheatgrass	Greasewood
Greasewood	Foxtail barley
Basin wildrye	Bottlebrush squirreltail
Nuttall saltbush	Poverty sumpweed
	Belvedere summercypress

20. Saline Upland: (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Inland saltgrass	Other weedy forbs
Bottlebrush squirreltail	Annuals
Sandberg bluegrass	Rabbitbrush

21. Sands and Sandy Range Site Association, 10-14" P. Z.

Sands:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Prairie sandreed	Needleandthread
Needleandthread	Threadleaf sedge
Sand bluestem	Fringed sagewort
Indian ricegrass	Green sagewort
Little bluestem	Scurfpea
Sun sedge	American licorice
Native legumes	Other weedy forbs
Skunkbush sumac	Rose
Yucca	Silver sagebrush
	Annuals
	Plains pricklypear

Sandy:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Needleandthread	Threadleaf sedge
Prairie sandreed	Blue grama
Threadleaf sedge	Needleandthread
Little bluestem	Sand dropseed
Sideoats grama	Red threeawn
Big bluestem	Fringed sagewort
Native legumes	Cudweed sagewort
Blue grama	Scurfpea
Skunkbush sumac	Other weedy forbs
Rose	Rose
	Annuals
	Plains pricklypear

22. Riverbreaks, 10-14" P. Z.

22. Riverbreaks (cont.)

Dominants in the Climax Vegetation

Ponderosa pine
Rocky Mountain juniper
Limber pine
Douglas-fir
Western and thickspike wheatgrass
Bluebunch wheatgrass
Green needlegrass
Prairie sandreed
Little bluestem
Greasewood
Big sagebrush
Needleandthread
Nuttall saltbush
Basin wildrye
Native legumes
Shadscale saltbush
Creeping juniper

Plants that Increase with Grazing Pressure

Blue grama
Needleandthread
Big sagebrush
Sandberg bluegrass
Plains muhly
Prairie junegrass
Rabbitbrush
Broom snakeweed
Hairy goldenaster
Pussytoes
Fringed sagewort
Phlox
Other weedy forbs
Creeping juniper
Annuals

23. Badlands, 10-14" P. Z.

Dominants in the Climax Vegetation

Western and thickspike wheatgrass
Green needlegrass
Little bluestem
Bluebunch wheatgrass
Prairie sandreed
Alkali sacaton
Prairie junegrass
Nuttall saltbush
Big sagebrush
American vetch
Plains muhly
Sideoats grama
Greasewood
Juniper

Plants that Increase with Grazing Pressure

Needleandthread
Threadleaf sedge
Blue grama
Plains reedgrass
Big sagebrush
Silver sagebrush
Juniper
Rabbitbrush
Broom snakeweed
Eriogonum
Phlox
Pussytoes
Hairy goldenaster
Golden pea
Other weedy forbs
Annuals

24. Forest-Grassland Complex, 12-14" P. Z., on Very Shallow to Deep Soils with Frigid Temperature Regimes. These Soils have Light Brown, Loamy Surfaces and Occur on Rolling to Hilly Terrain.

Forest: (50%)

24. Forest: (50%) (cont.)

Dominants in the Climax Vegetation

Ponderosa pine
Rocky Mountain juniper
Little bluestem
Bluebunch wheatgrass
Sideoats grama
Skunkbush sumac
Western wheatgrass
Native legumes

Plants that Increase with Grazing Pressure

Needleandthread
Western wheatgrass
Prairie junegrass
Snowberry
Fringed sagewort
Other weedy forbs
Annuals

Rocky Mountain juniper will increase in areas where ponderosa pine has been removed by fire, logging, insects, or disease.

Grassland: (50%)

Dominants in the Climax Vegetation

Little bluestem
Needleandthread
Western wheatgrass
Green needlegrass
Bluebunch wheatgrass
Prairie sandreed
Big bluestem
Native legumes
Skunkbush sumac
Yucca
Prairie junegrass
Blue grama

Plants that Increase with Grazing Pressure

Needleandthread
Blue grama
Threadleaf sedge
Prairie junegrass
Sandberg bluegrass
Big sagebrush
Fringed sagewort
Hairy goldenaster
Other weedy forbs
Broom snakeweed
Annuals

25. Forest-Grassland Complex, 15-19" P. Z., on Very Shallow to Deep Soils with a Frigid Temperature Regime. These Soils have Light Brown, Loamy Surfaces and Occur on Undulating to Hilly Terrain.

Forest: (60%)

Dominants in the Climax Vegetation

Ponderosa pine
Bluebunch wheatgrass
Idaho fescue
Little bluestem
Sideoats grama
Snowberry

Plants that Increase with Grazing Pressure

Needleandthread
Western wheatgrass
Sedge
Snowberry
Rose
Scurfpea

25. Forest: (60%) (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Native legumes	Arrowleaf balsamroot
Arrowleaf balsamroot	Other weedy forbs
Green needlegrass	Annuals
Common chokecherry	
Saskatoon serviceberry	

Grassland: (40%)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Big bluestem	Needleandthread
Bluebunch wheatgrass	Western wheatgrass
Western wheatgrass	Sedge
Green needlegrass	Kentucky bluegrass
Needleandthread	Lupine
Prairie junegrass	Snowberry
Basin wildrye	Big sagebrush
Lupine	Silver sagebrush
Snowberry	Broom snakeweed
Saskatoon serviceberry	Other weedy forbs
Common chokecherry	Annuals

26. Ponderosa Pine Forest on Moderately Deep to Deep Soils with a Frigid Temperature Regime. These Soils have Light Brown to Brown Surfaces and Occur on Undulating to Steep Terrain, 15-19" P. Z.

Ponderosa pine is the only native tall coniferous tree species adapted to the soils of this unit. Commonly, these areas of continuous ponderosa pine climax forest occur on the higher benchlands (4,000-5,000 feet in elevation) and steeper slopes associated with the benchlands in eastern Montana. Soil parent materials are derived from the Fort Union Geologic Formation.

Typical overstory composition is:

Ponderosa pine	100%

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Ponderosa pine	Needleandthread
Rocky Mountain juniper	Western wheatgrass
Big bluestem	Sedge
Prairie sandreed	Kentucky bluegrass

26. Ponderosa Pine Forest (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Green needlegrass	Prairie junegrass
Bluebunch wheatgrass	Lupine
Prairie junegrass	Fringed sagewort
Sideoats grama	Other weedy forbs
Idaho fescue	Annuals
Skunkbush sumac	Big sagebrush
Western snowberry	Silver sagebrush
Russet buffaloberry	
Common chokecherry	
Saskatoon serviceberry	

WESTERN SEDIMENTARY PLAINS:

27. Silty Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Blue grama
Western and thickspike wheatgrass	Needleandthread
Needleandthread	Sandberg bluegrass
Green needlegrass	Threadleaf sedge
Basin wildrye	Prairie junegrass
Threadleaf sedge	Big sagebrush
Prairie junegrass	Western snowberry
Native legumes	Rabbitbrush
Big and silver sagebrush	Broom snakeweed
Skunkbush sumac	Fringed sagewort
Common chokecherry	Hairy goldenaster
Blue grama	Western yarrow
	Pussytoes
	Other weedy forbs
	Annuals

28. Silty Range Site, 15-19" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Needleandthread
Western and thickspike wheatgrass	Western and thickspike wheatgrass
Idaho fescue	Prairie junegrass
Green needlegrass	Sandberg bluegrass

28. Silty Range Site (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Basin wildrye	Big sagebrush
Needleandthread	Western snowberry
Native legumes	Fringed sagewort
Big sagebrush	Golden pea
Sticky geranium	Scurfpea
Prairiesmoke	Other weedy forbs
	Annuals

29. Silty-Clayey Range Site Complex, 10-14" P. Z.

Silty: Same as Site No. 27

Clayey: Same as Site No. 31

30. Silty-Clayey Range Site Complex, 15-19" P. Z.

Silty: Same as Site No. 28

Clayey: Same as Site No. 32

31. Clayey and Shallow Clay Range Site Association, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Bluebunch wheatgrass	Blue grama
Green needlegrass	Prairie junegrass
Big sagebrush	Needleandthread
Prairie junegrass	Sandberg bluegrass
Plains reedgrass	Rabbitbrush
*Prairie sandreed	Broom snakeweed
Milkvetch	Eriogonum
	Annuals
	White pointloco
	Milkvetch
	Onion
	Other weedy forbs

*Growing on fractured shale outcrops

32. Clayey and Shallow Clay Range Site Association, 15-19" P. Z.

32. Clayey and Shallow Clay Range Site Association (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Prairie junegrass
Columbia and green needlegrass	Idaho fescue
Idaho fescue	Cusick bluegrass
Basin wildrye	Big sagebrush
Big sagebrush	Western snowberry
Western and thickspike wheatgrass	Shrubby cinquefoil
Prairie junegrass	Fringed sagewort
*Prairie sandreed	Milkvetch
Lupine	Golden pea
Other native legumes	Other weedy forbs
Sticky geranium	Annuals
Prairiesmoke	

*Growing on fractured shale outcrops

33. Dense Clay-Clayey-Saline Upland Range Site Complex, 5-9" P. Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Inland saltgrass	Rabbitbrush
Nuttall saltbush	Broom snakeweed
Big sagebrush	Inland saltgrass
Black sagebrush	Eriogonum
Bud sagebrush	Curlycup gumweed
Shadscale saltbush	Milkvetch
Greasewood	Other weedy forbs
Sandberg bluegrass	Annuals
Prairie junegrass	Sandberg bluegrass

Clayey:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Blue grama
Bluebunch wheatgrass	Big sagebrush
Prairie junegrass	Prairie junegrass
	Rabbitbrush

33. Clayey: (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Plains reedgrass	Broom snakeweed
Big sagebrush	Milkvetch
Bud sagebrush	Curlycup gumweed
Milkvetch	Other weedy forbs
Winterfat	Sandberg bluegrass
Blue grama	Annuals

Saline Upland:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Alkali sacaton	Inland saltgrass
Western and thickspike wheatgrass	Greasewood
Greasewood	Foxtail barley
Nuttall saltbush	Bottlebrush squirreltail
Shadscale saltbush	Poverty sumpweed
Fourwing saltbush	Seepweed
Inland saltgrass	Belvedere summercypress
Big sagebrush	Other weedy forbs
Bottlebrush squirreltail	Other annuals
Sandberg bluegrass	Rabbitbrush

34. Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P. Z.

Dense Clay:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Rabbitbrush
Inland saltgrass	Prairie junegrass
Big sagebrush	Sandberg bluegrass
Nuttall saltbrush	Inland saltgrass
Greasewood	Onion
Prairie junegrass	Other weedy forbs
Sandberg bluegrass	Annuals

Clayey: Same as Site No. 31

Saline Upland:

34. Saline Upland (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Alkali sacaton	Greasewood
Western and thickspike wheatgrass	Big sagebrush
Greasewood	Inland saltgrass
Nuttall saltbush	Bottlebrush squirreltail
Basin wildrye	Plains pricklypear
Inland saltgrass	Sandberg bluegrass
Big sagebrush	
Bottlebrush squirreltail	

35. Riverbreaks, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Ponderosa pine	Needleandthread
Rocky Mountain juniper	Blue grama
Limber pine	Sandberg bluegrass
Douglas-fir (north slopes)	Prairie junegrass
Bluebunch wheatgrass	Threadleaf sedge
Western and thickspike wheatgrass	Big sagebrush
Green needlegrass	Rabbitbrush
Prairie sandreed	Creeping juniper
Basin wildrye	Fringed sagewort
Needleandthread	Pussytoes
Greasewood	Hairy goldenaster
Big sagebrush	Other weedy forbs
Creeping juniper	Annuals
Native legumes	
Prairie junegrass	

36. Forest-Grassland Complex, 12-14" P. Z., on Very Shallow to Deep Soils with a Frigid Temperature Regime. These Soils have Light Brown, Loamy Surfaces and Occur on Rolling to Steep Terrain.

Forest: (50%)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Ponderosa pine	Needleandthread
Rocky Mountain juniper	Western wheatgrass
Bluebunch wheatgrass	Prairie junegrass
Western wheatgrass	Snowberry
Skunkbush sumac	Rose

36. Forest: (50%) (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Snowberry	Fringed sagewort
Needleandthread	Other weedy forbs

Rocky Mountain juniper will increase in areas where ponderosa pine has been removed by fire, logging, insects, or disease.

Grassland: (50%)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Needleandthread
Needleandthread	Western and thickspike wheatgrass
Western and thickspike wheatgrass	Blue grama
Green needlegrass	Sandberg bluegrass
Big sagebrush	Big sagebrush
Prairie sandreed	Broom snakeweed
Native legumes	Rabbitbrush
Prairie junegrass	Fringed sagewort
	Hairy goldenaster
	Other weedy forbs
	Annuals

FOOTHILLS AND MOUNTAINS:

37. Silty Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Big sagebrush
*Rough fescue	Needleandthread
Needleandthread	Threadleaf sedge
Prairie junegrass	Prairie junegrass
Western and thickspike wheatgrass	**Blue grama
Green needlegrass	Western yarrow
Basin wildrye	Fringed sagewort
	Hairy goldenaster

*Codominant with bluebunch wheatgrass west of the Continental Divide but insignificant on the east side in the 10-14" precipitation zone.

**Insignificant west of the Continental Divide.

37. Silty Range Site (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Threadleaf sedge	Pussytoes
Native legumes	Other weedy forbs
Big sagebrush	Rabbitbrush
Winterfat	Broom snakeweed
Idaho fescue	Plains pricklypear

38. Silty Range Site, 15-19" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Rough fescue	Idaho fescue
Idaho fescue	Prairie junegrass
Bluebunch wheatgrass	Timber danthonia
Columbia needlegrass	Big sagebrush
Basin wildrye	Kentucky bluegrass
Spike fescue	Timothy
Parry danthonia	Shrubby cinquefoil
Slender wheatgrass	Lupine
Lupine	Cinquefoil forbs
Sticky geranium	Arrowleaf balsamroot
Arrowleaf balsamroot	Pussytoes
Prairiesmoke	Western yarrow
Big sagebrush	Other weedy forbs
Tall larkspur	Threadleaf sedge
Prairie junegrass	Sandberg bluegrass
Timber danthonia	Onespike danthonia
Big bluegrass	Annuals
	Snowberry

39. Silty Range Site, 20-24" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Rough fescue	Idaho fescue
Columbia needlegrass	Canby bluegrass
Richardson needlegrass	Danthonia
Mountain brome	Timothy
Bearded wheatgrass	Kentucky bluegrass
Slender wheatgrass	Big sagebrush
Basin wildrye	Shrubby cinquefoil
Idaho fescue	Prairiesmoke
Lupine	Cinquefoil forbs
Sticky geranium	Lupine

39. Silty Range Site (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Prairiesmoke	Mulesear wyethia
Tall larkspur	Tall larkspur
Big sagebrush	Other weedy forbs
Spike fescue	Snowberry
Spike trisetum	Annuals
Purple oniongrass	
Nodding brome	
Quaking aspen	
American bistort	

40. Silty-Clayey Range Site Complex, 10-14" P. Z.

Silty: Same as Site No. 37

Clayey: Same as Site No. 42

41. Silty-Clayey Range Site Complex, 15-19" P. Z.

Silty: Same as Site No. 38

Clayey: Same as Site No. 43

42. Clayey and Shallow Clay Range Site Association, 10-14" P. Z.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Big sagebrush
Western and thickspike wheatgrass	Prairie junegrass
Green needlegrass	Plains reedgrass
Basin wildrye	Cusick bluegrass
Prairie junegrass	Rabbitbrush
Plains reedgrass	Biscuitroot
Big sagebrush	Onion
Milkvetch	White pointloco
American vetch	Curlycup gumweed
Biscuitroot	Other weedy forbs
	Broom snakeweed
	Gray horsebrush
	Plains pricklypear
	Annuals

43. Clayey and Shallow Clay Range Site Association, 15-19" P. Z.

43. Clayey and Shallow Clay Range Site Association (cont.)

Dominants in the Climax Vegetation

*Rough fescue
Bluebunch wheatgrass
Columbia needlegrass
Western and thickspike wheatgrass
Idaho fescue
Basin wildrye
Lupine
Sticky geranium
Arrowleaf balsamroot
Big sagebrush
Prairiesmoke
Prairie junegrass
Deathcamas

Plants that Increase with Grazing Pressure

Idaho fescue
Western and thickspike wheatgrass
Big sagebrush
Kentucky bluegrass
Timothy
Danthonia
Snowberry
Lupine
Arrowleaf balsamroot
Cinquefoil forbs
White pointloco
Other weedy forbs
Shrubby cinquefoil
Annuals

*Insignificant in south central Montana

44. Saline Lowland Range Site, 10-14" P. Z.

Dominants in the Climax Vegetation

Basin wildrye
Alkali sacaton
Nuttall alkaligrass
Alkali cordgrass
Slender wheatgrass
Western wheatgrass
Inland saltgrass
Greasewood
Silver buffaloberry

Plants that Increase with Grazing Pressure

Inland saltgrass
Greasewood
Scratchgrass
Foxtail barley
Bottlebrush squirreltail
Shore arrowgrass
Poverty sumpweed
Belvedere summercypress
Silver buffaloberry
Rose

45. Sands and Sandy Range Site Association, 10-14" P. Z.

Sands:

Dominants in the Climax Vegetation

Prairie sandreed
Needleandthread
Indian ricegrass
Bluebunch wheatgrass

Plants that Increase with Grazing Pressure

Needleandthread
Threadleaf sedge
Sandberg bluegrass
Sand dropseed

45. Sands: (cont.)

Dominants in the Climax Vegetation

Threadleaf sedge
Native legumes
Skunkbush sumac
Yucca

Plants that Increase with Grazing Pressure

Hairy goldenaster
Sageworts
American licorice
Other weedy forbs
Rabbitbrush
Annuals
Plains pricklypear

Sandy:

Dominants in the Climax Vegetation

Needleandthread
Bluebunch wheatgrass
Native legumes
Threadleaf sedge
Big sagebrush
Prairie junegrass
Skunkbush sumac

Plants that Increase with Grazing Pressure

Blue grama
Needleandthread
Threadleaf sedge
Sand dropseed
Sageworts
Hairy goldenaster
Other weedy forbs
Annuals
Plains pricklypear

46. Limy-Shallow-Very Shallow Range Site Complex, 10-14" P. Z.

Limy:

Dominants in the Climax Vegetation

Bluebunch wheatgrass
Prairie junegrass
Needleandthread
Threadleaf sedge
Western and thickspike wheatgrass
Sandberg bluegrass
Native legumes
Winterfat

Plants that Increase with Grazing Pressure

Sandberg bluegrass
Blue grama
Needleandthread
Threadleaf sedge
Fringed sagewort
Hairy goldenaster
Other weedy forbs
Annuals
Rabbitbrush
Broom snakeweed
Plains pricklypear

Shallow:

46. Shallow: (cont.)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Needleandthread
Rough fescue	Blue grama
Needleandthread	Sandberg bluegrass
Big sagebrush	Threadleaf sedge
Prairie junegrass	Red threeawn
Western wheatgrass	Big sagebrush
Sandberg bluegrass	Phlox
Gray horsebrush	Pussytoes
Phlox	Arrowleaf balsamroot
Native legumes	Fringed sagewort
	Hairy goldenaster
	Other weedy forbs
	Annuals
	Rabbitbrush
	Broom snakeweed

Very Shallow:

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Threadleaf sedge
Prairie junegrass	Sandberg bluegrass
Western wheatgrass	Needleandthread
Threadleaf sedge	Prairie junegrass
Phlox	Phlox
Needleandthread	Pussytoes
Sandberg bluegrass	Eriogonum
Native legumes	Hairy goldenaster
*Shrubs and scrub trees	Other weedy forbs
	Annuals
	Broom snakeweed

*Mountainmahogany, limber pine, antelope bitterbrush, big sagebrush, and Rocky Mountain juniper grow in deeper soil pockets and cracks and crevices in the bedrock.

47. Subirrigated and Wetland Range Site Association

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Tall reedgrasses	Kentucky bluegrass
Tufted hairgrass	Redtop
American mannagrass	Low sedges

47. Subirrigated and Wetland Range Site Association (cont.)

Dominants in the Climax Vegetation

- Tall sedges
- Slender wheatgrass
- Bearded wheatgrass
- Basin wildrye
- Willows
- Shrubby cinquefoil
- Prairie cordgrass
- Elephanthead pedicularis
- Monkeyflower
- Native clovers
- Indianpaintbrush
- Common blue-eyedgrass

Plants that Increase with Grazing Pressure

- Foxtail barley
- Meadow barley
- Baltic rush
- Rocky Mountain iris
- Horsetail
- Shore arrowgrass
- Golden pea
- Cinquefoil forbs
- Thistles
- Other weedy forbs
- Annuals
- Shrubby cinquefoil

48. Alpine Grassland on Deep to Moderately Deep, Well Drained to Poorly Drained Soils with Cryic Temperature Regimes. These Soils have Dark Brown and Very Dark Brown Surfaces and Occur on Sloping to Steep Windswept Mountain Tops above Timberline. Soil Parent Materials Variable. 40-70" P. Z.

White dryad is most commonly associated with well to excessively drained soils derived from limestone. The willows are confined to somewhat poorly and poorly drained soils.

Dominants in the Climax Vegetation

- Tufted hairgrass
- Sedge
- Sheep fescue
- Alpine bluegrass
- Alpine timothy
- Native legumes
- Wolf willow
- Red mountainheath
- White dryad
- Alpine bluebell
- Bluejoint
- Purple reedgrass
- Moss silene
- Yellow avens
- Tufted Phlox
- Eriogonum
- American bistort
- Shrubby cinquefoil

Plants that Increase with Grazing Pressure

- Sedge
- Phlox
- Pussytoes
- Forgetmenot
- Cinquefoil forbs
- Creeping silene
- Eriogonum
- Shrubby cinquefoil

49. Forest-Grassland Complex, 15-19" P. Z., on Shallow to Moderately Deep Soils with a Frigid Temperature Regime. These Soils have Brown to Dark Brown Surfaces under Grassland and Brown to Gray Surfaces under Forest and Occur on Sloping to Steep Terrain.

Forest: (60%)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Douglas-fir	Common snowberry
Common snowberry	Woods rose
White spiraea	Timber danthonia
Oregongrape	Kentucky bluegrass
Heartleaf arnica	Lupine
Columbia needlegrass	Other weedy forbs
Idaho fescue	
Bearded wheatgrass	
Kinnikinnick	
Woods rose	
Utah honeysuckle	
Common juniper	
Lupine	
Wood lily	

With a loss of the climax forest overstory, ponderosa pine and occasionally lodgepole pine can occupy the Douglas-fir climax forest sites.

Grassland: (40%)

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Bluebunch wheatgrass	Idaho fescue
Idaho fescue	Prairie junegrass
Columbia needlegrass	Timber danthonia
Basin wildrye	Big sagebrush
*Rough fescue	Kentucky bluegrass
Spike fescue	Timothy
Parry danthonia	Shrubby cinquefoil
Slender wheatgrass	Lupine
Lupine	Cinquefoil forbs
Sticky geranium	Arrowleaf balsamroot
Arrowleaf balsamroot	Pussytoes
Prairiesmoke	Western yarrow
Big sagebrush	Other weedy forbs
Tall larkspur	Threadleaf sedge
Prairie junegrass	Sandberg bluegrass
Timber danthonia	Onespike danthonia
Big bluegrass	Annuals
	Common snowberry

*Insignificant in Crown Butte area of the Pryor Mountains.

50. Rocky Mountain Juniper and Limber Pine on Shallow Soils with a Frigid Temperature Regime and Dark Grayish Brown Surfaces. These soils are Developed from Limestone or Calcareous Sandstone Residuum and Occur on Moderately Steep to Very Steep Mountain Slopes. Rock Outcrop Covers 40 to 70 Percent of the Unit, 10-14" P.Z.

This unit occurs on the south and west sides of mountain ranges with a general north-south orientation. Such areas are broken by many drainageways. Consequently there are many inclusions of north and east facing slopes within the unit. Forest growth is found on the included north and east facing slopes, footslopes, and along the many drainageways where soil and moisture relationships are most favorable for plant growth. On south and west facing slopes where soils occur among the massive areas of rock outcrop they support a few scattered trees, shrubs, and grasses. Elevational limits of this unit are 4000-6000 feet.

Typical overstory composition is:

Rocky Mountain juniper	60%
Limber Pine	40%

Utah juniper becomes a significant component on the south side of Pryor Mountains. Douglas-fir occasionally is found at the higher elevations on north facing slopes.

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Rocky Mountain juniper	Big sagebrush
Limber pine	Prairie junegrass
Utah juniper	Sandberg bluegrass
Douglas-fir	Other weedy forbs
Curlleaf mountainmahogany	Annuals
Bluebunch wheatgrass	
Black sagebrush	
Big sagebrush	
Prairie junegrass	
Sandberg bluegrass	

51. Douglas-fir and Ponderosa Pine Climax Forests on Deep Soils. These Soils have a Cryic Temperature Regime and Brown or Light Brownish Gray Surfaces on North Aspects and a Frigid Temperature Regime and Grayish Brown or Light Brownish Gray Surfaces on East, South and West Aspects. Terrain is Steep to Very Steep Mountain Slopes. Parent Materials are Generally Colluvium from Igneous Intrusive or Limestone Sources, 16-22" P.Z.

Ponderosa pine climax forests occur on strongly sloping to very steep south and west facing slopes at elevations of 4,000-6,000 feet and east aspects to about 5,000 feet. Associated soils have a frigid temperature regime and light brownish gray surfaces. Douglas-fir climax forests occur above the ponderosa pine forests on east, west, and south aspects and on steep to very steep north

51. Douglas-fir and Ponderosa Pine Climax Forests (cont.)

facing slopes from about 4,000-7,000 feet. Soils associated with the Douglas-fir climax forests have frigid or cryic temperature regimes and light gray or dark yellowish brown surfaces. The cryic soils occur only on north facing slopes within the cooler and more moist portions of the Douglas-fir climax forest. Where the Douglas-fir climax forest occurs to 7,000 feet on north facing slopes, the soils are developed in parent materials derived from limestone sources, have a cryic temperature regime, and dark yellowish brown surfaces. Elevational limits of this unit are 4,000-7,000 feet.

Typical overstory composition is:

Douglas-fir	60%
Ponderosa pine	40%

Dominants in the Climax Vegetation

- Douglas-fir
- Ponderosa pine
- Rocky Mountain juniper
- Pinegrass
- Bluebunch wheatgrass
- Common snowberry
- Idaho fescue
- White spiraea
- Elk sedge
- Mallow ninebark
- Oregongrape
- Heartleaf arnica
- Columbia needlegrass
- Bearded wheatgrass
- Mountain brome
- Richardson needlegrass
- Twinflower
- Kinnikinnick
- Woods rose
- Utah honeysuckle
- Common juniper
- Lupine

Plants that Increase with Grazing Pressure

- Pinegrass
- Danthonia
- Common snowberry
- Kentucky bluegrass
- Prairie junegrass
- Other weedy forbs
- Woods rose
- Mallow ninebark

In this forest complex, with a loss of the climax forest overstory, ponderosa pine can occupy the Douglas-fir climax forest sites on frigid soils. Lodgepole pine frequently occupies the Douglas-fir sites on soils with a cryic temperature regime. Rocky Mountain juniper may increase on ponderosa pine climax forest sites.

52. Subalpine Fir, Douglas-fir, and Ponderosa Pine Climax Forests on Deep Soils with Cryic and Frigid Temperature Regimes. These Soils have Grayish Brown, Light Brownish Gray, or Light Yellowish Brown Surfaces and Occur on Moderately Steep to Very Steep Mountain Slopes East of the Continental Divide. Parent Materials of These Soils are Derived from Quartzites, Argillites, and Limestones of the Belt Series and Igneous Intrusive Rocks, 16-35" P. Z.

Ponderosa pine climax forests occur on moderately steep to very steep south and west facing slopes at elevations below about 5,000 feet. Associated soils have a frigid temperature regime and grayish brown surfaces. Douglas-fir climax forests occur on strongly sloping to very steep south and west facing mountain slopes at elevations of 5,000-7,500 feet and the forested foot slopes to the valleys and north and east aspects below 5,000-5,500 feet in elevation. Associated soils have frigid temperature regimes and light brownish gray surfaces. In areas where the soils are derived from limestone or dolomite slopewash and are calcareous to with 24 inches or less of the soil surface, the upper boundary of the Douglas-fir zone may be 1,000 feet higher. Here soil surfaces are commonly brown to dark brown and may have a cryic temperature regime. The subalpine fir climax forest occurs above the upper limits of the Douglas-fir climax forest zone and is associated with soils having a cryic temperature regime and light yellowish brown to pale brown surfaces, occasionally light gray surfaces where the subsoils are moderately fine in texture or finer. Engelmann spruce occasionally is the climax forest overstory component along the lower portion of the subalpine fir zone on soils with favorable moisture-holding capacity or where extra moisture is available from run-in or water table. Elevational limits of the unit are 3,000-8,000 feet.

Typical overstory composition is:

Subalpine fir	50%
Douglas-fir	35%
Ponderosa pine	10%
Engelmann spruce	5%

Dominants in the Climax Vegetation

Subalpine fir
Douglas-fir
Ponderosa pine
Engelmann spruce
Pinegrass
Grouse whortleberry
Dwarf huckleberry
Bluebunch wheatgrass
Mountain brome
Columbia needlegrass

Plants that Increase with Grazing Pressure

Pinegrass
Danthonia
Prairie junegrass
Kentucky bluegrass
Other weedy forbs
Annuals
Snowberry
Rose
Mallow ninebark

52. Subalpine Fir, Douglas-fir, and Ponderosa Pine Climax Forests (cont.)

Dominants in the
Climax Vegetation

Elk sedge
Heartleaf arnica
Common snowberry
Mallow ninebark
Blue wildrye
Richardson needlegrass
Bearded wheatgrass
Idaho fescue
Beargrass
Rough fescue
Oregongrape
Twinflower

In this forest complex, with a loss of the climax forest overstory, lodgepole pine can occupy Douglas-fir and subalpine fir sites, Douglas-fir can occupy a portion of the subalpine fir sites, and ponderosa pine can occupy the Douglas-fir sites. Limber pine can be found on rocky soils at the lowest elevations and limber pine or whitebark pine at the highest elevation of this unit.

53. Subalpine Fir and Douglas-fir Climax Forests on Deep Soils with Cryic Temperature Regimes. These Soils have Pale Brown or Light Brownish Gray Surfaces and Occur on Moderately Steep to Very Steep Mountain Slopes. Soil Parent Materials are Highly Variable and Include Sedimentary, Igneous, and Metamorphic Rock Sources, 20-45" P. Z.

Douglas-fir climax forests occur on foot slopes to the valleys, strongly sloping to very steep south and west facing slopes to elevations of 6,500-7,000 feet and north and east aspects below elevations of 5,500-6,000 feet. Associated soils generally have light brownish gray surfaces. In areas where the soils are derived from limestone or dolomite slopewash and are calcareous to within 24" or less of the soil surface, the upper boundary of the Douglas-fir zone may be 1,000 feet higher. Here soil surfaces are commonly brown to dark grayish brown. The subalpine fir climax forest zone occurs above the Douglas-fir zone and is associated with soils having light yellowish brown to pale brown surfaces, occasionally light gray surfaces where the subsoils are moderately fine or finer in texture. Engelmann spruce occasionally is the climax forest overstory component along the lower portion of the subalpine fir zone on soils with favorable moisture-holding capacity or where extra moisture is available from run-in or water table. Elevational limits of this unit are 5,000-9,000 feet.

53. Subalpine Fir and Douglas-fir Climax Forests (cont.)

Typical overstory composition is:

Subalpine fir	65%
Douglas-fir	25%
Engelmann spruce	10%

Dominants in the Climax Vegetation

- Subalpine fir
- Douglas-fir
- Engelmann spruce
- Pinegrass
- Grouse whortleberry
- Heartleaf arnica
- Blue huckleberry
- Common beargrass
- Elk sedge
- Dwarf huckleberry
- Bearded wheatgrass
- Mallow ninebark
- Oregongrape
- Saskatoon serviceberry
- Richardson needlegrass
- Columbia needlegrass
- Spike trisetum
- Blue wildrye
- Idaho fescue

Plants that Increase with Grazing Pressure

- Pinegrass
- Danthonia
- Kentucky bluegrass
- Weedy forbs
- Annuals
- Common snowberry
- Rose

In this forest complex, with a loss of the climax forest overstory, lodgepole pine can occupy the Douglas-fir and all but the upper limits of the subalpine fir sites. Engelmann spruce may occur throughout the subalpine fir zone. Whitebark pine can be found occupying sites near the upper limits of the subalpine fir zone and the Douglas-fir climax zone where it occurs near timberline on calcareous soils. Quaking aspen may occur throughout the Douglas-fir zone, the spruce zone, and lower 2/3 of the subalpine fir zone, particularly on clayey or loamy soils low in coarse fragment content. Douglas-fir may move into the lower 2/3 of the subalpine fir zone.

54. Spruce and Douglas-fir Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes. These Soils have Brown or Grayish Brown Surfaces and Occur on Strongly Sloping to Very Steep Mountain Slopes. Parent Materials are Derived from Limestones of the Big Snowy Group of the Mississippian Formation, 20-45" P. Z.

Douglas-fir climax forests occur on strongly sloping to very steep south and west facing slopes to elevations of 6,000-6,500 feet.

54. Spruce and Douglas-fir Climax Forests (cont.)

Associated soils have a frigid temperature regime and grayish brown surfaces. The spruce and subalpine fir occur on strongly sloping to steep north and east facing slopes and above the Douglas-fir climax forests on south and west slopes. Associated soils have a cyric temperature regime. The spruce occurs predominantly on soils with brown surface layers and calcareous layers within about 24 inches or less of the soil surface. The subalpine fir occurs above the spruce where the calcareous layers are deeper in the soil or on soils within the spruce zone derived from noncalcareous parent materials. Elevational range of this unit is 5,500-8,000 feet.

Typical overstory composition is:

Spruce	50%
Douglas-fir	40%
Subalpine fir	10%

Dominants in the Climax Vegetation

White spruce
Douglas-fir
Subalpine fir
Heartleaf arnica
Elk sedge
Common snowberry
Pinegrass
Common juniper
Bluebunch wheatgrass
Idaho fescue
Twinflower
Grouse whortleberry
Columbia needlegrass
Mountain brome
Richardson needlegrass
Blue wildrye
Bearded wheatgrass
Mallow ninebark

Plants that Increase with Grazing Pressure

Pinegrass
Danthonia
Kentucky bluegrass
Weedy forbs
Annuals
Common snowberry
Rose
Mallow ninebark

In this forest complex, spruce (similar to white spruce) dominates sites normally occupied by subalpine fir. Soils in this complex are alkaline in reaction throughout the soil profile, and the spruce seems to replace subalpine fir on these sites. Douglas-fir occupies the drier aspects and can occupy the lower elevations of the spruce zone when the spruce stands are opened up. Subalpine fir is a very minor species of this complex. Limber pine or whitebark pine can be found at the upper elevational limits of this unit and limber pine on south and west facing slopes at the lowest elevations.

55. Subalpine Fir, Douglas-fir, and Ponderosa Pine Climax Forests on Deep Soils with Cryic and Frigid Temperature Regimes. These Soils have Grayish Brown, Light Brownish Gray, or Light Yellowish Brown Surfaces and Occur on Moderately Steep to Very Steep Mountain Slopes West of the Continental Divide. Parent Materials are Primarily Derived from Quartzites and Argillites of the Belt Series. Some Parent Materials Derived from Limestone and Igneous Intrusive Rocks Also Occur, 16-70" P. Z.

Ponderosa pine climax forests occur on moderately steep to very steep south and west facing slopes at elevations below 4,500 feet and very gravelly, excessively- to well-drained soils along stream bottoms. Associated soils have a frigid temperature regime and grayish brown surfaces. Douglas-fir climax forests occur on strongly sloping to very steep south and west facing mountain slopes at elevations of 5,000-6,000 feet, sloping to strongly sloping foot slopes to the valleys, and steep to very steep north and east aspects below 4,500 feet in elevation. Associated soils have a frigid temperature regime and light brownish gray surfaces, occasionally pale brown surfaces. In areas where the soils are derived from limestone or dolomite slopewash and are calcareous to within 24 inches or less of the soil surface, the upper boundary of the Douglas-fir zone may be 1,000 feet higher. Here soil surfaces are commonly brown to dark grayish brown and may have a cryic temperature regime. The subalpine fir climax forest zone occurs above the Douglas-fir zone and is associated with soils having a cryic temperature regime and light yellowish brown or pale brown surfaces, occasionally light gray surfaces where the subsoils are moderately fine in texture or finer. Engelmann spruce occasionally is the climax forest overstory component along the lower portion of the subalpine fir zone on soils with favorable moisture-holding capacity or where extra moisture is available from run-in or water table. Grand fir and western redcedar can be found as occasional narrow stringers along drainageways or in pockets at the lower elevations of this unit. Elevational range of the unit is 3,000-9,000 feet.

Typical overstory composition is:

Subalpine fir	50%
Dougals-fir	35%
Ponderosa pine	10%
Engelmann spruce	5%

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Subalpine fir	Pinegrass
Douglas-fir	Danthonia
Ponderosa pine	Prairie junegrass
Engelmann spruce	Kentucky bluegrass

55. Subalpine Fir, Douglas-fir, and Ponderosa Pine Climax Forests (cont.)

Dominants in the Climax Vegetation

Pinegrass
Common beargrass
Heartleaf arnica
Blue huckleberry
Grouse whortleberry
Bluebunch wheatgrass
Common snowberry
Idaho fescue
Mallow ninebark
Rusty menziesia
Rough fescue
Purple reedgrass
Oceanspray
Saskatoon serviceberry

Plants that Increase with Grazing Pressure

Weedy forbs
Annuals
Common snowberry
Rose
Mallow ninebark

In this forest complex, with a loss of the climax forest overstory, lodgepole pine can occupy Douglas-fir and all but the upper limits of the subalpine fir sites; Engelmann spruce may occur throughout the subalpine fir zone. Whitebark pine can be found occupying sites near the upper limits of the subalpine fir zone and the Douglas-fir climax zone where it occurs near timberline on calcareous soils. Douglas-fir can occupy a portion of the subalpine fir sites and ponderosa pine can occupy the Douglas-fir sites. Western larch can occupy the Douglas-fir climax sites and lower portions of the subalpine fir climax sites. Alpine larch may be found in some areas at the upper elevational limits of the unit.

56. Douglas-fir Climax Forests on Deep Soils with a Frigid Temperature Regime. These Soils have Light Gray Surfaces and Occur on Gently Rolling to Hilly Valley Foot Slopes. Parent Materials are Derived Predominantly from Calcareous Rock Sources. Usually, the Parent Material is Calcareous Glacial Till Forming Mountain Foot Slopes. In a Few Areas the Parent Material is Slopewash or Colluvium Associated with Steep Mountain Slopes or Clayey Outwash Forming Mountain Foot Slopes, 16-30" P. Z.

Douglas-fir climax forests occur on foot slopes to the valleys of northwestern Montana. Parent materials are generally calcareous glacial till, and soils associated with the till are rarely leached of calcium carbonate to depths greater than 24 inches. In a few areas, Douglas-fir in this unit can be found on soils where calcium carbonate is leached to greater depths. However, such soils have distinct subsoil clay accumulations and high base saturation. Grand fir and occasionally western redcedar or western hemlock are found within this unit on soils more deeply leached of calcium carbonate

56. Douglas-fir Climax Forests (cont.)

in areas of restricted moisture drainage or areas of moisture accumulation, frequently along drainageways. Engelmann spruce climax forests occur in situations similar to grand fir at the higher elevations within the unit. Subalpine fir climax forests infrequently occur on north facing mountain slopes at elevations above 5,500 feet where the soil parent materials are noncalcareous. Elevational limits of this unit are 3,000-6,500 feet.

Typical overstory composition is:

Douglas-fir	90%
Grand fir	10%

Dominants in the Climax Vegetation

- Douglas-fir
- Grand fir
- Common snowberry
- Pinegrass
- Saskatoon serviceberry
- Oregongrape
- Kinnikinnick
- Mallow ninebark
- Elk sedge
- White spiraea
- Common beargrass
- Heartleaf arnica
- Broadleaf arnica
- Rough fescue
- Idaho fescue
- Richardson needlegrass
- Columbia needlegrass
- Oceanspray
- Woods rose
- Western meadowrue
- Scouler willow
- Rocky Mountain maple
- Myrtle pachistima
- Blue huckleberry
- Dwarf huckleberry

Plants that Increase with Grazing Pressure

- Common snowberry
- Common beargrass
- Mallow ninebark
- Oceanspray
- Myrtle pachistima
- Burr clover
- Kentucky bluegrass

In this unit, with a loss of the climax forest overstory, ponderosa pine, western larch, and occasionally lodgepole pine may occupy the Douglas-fir sites. Usually, however, Douglas-fir follows Douglas-fir. Douglas-fir, western larch, ponderosa pine, lodgepole pine, and western white pine may occupy the grand fir sites. Small scattered areas of climax western redcedar stands are also included in this unit.

57. Subalpine Fir, Douglas-fir, and Grand Fir Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes. These Soils have Light Gray or Pale Brown Surfaces and Occur on Steep to Very Steep Mountain Slopes. Parent Materials are Primarily Derived from the Quartzites, Argillites, and Limestones of the Belt Series, 30-70" P. Z.

Douglas-fir climax forests occur primarily on steep to very steep south and west facing slopes at elevations below 5,000 feet. Associated soils have a frigid temperature regime and light gray surfaces. It is also found on very gravelly droughty soils on terraces along drainageways. Subalpine fir climax forests occur on north and east facing slopes and on south and west facing slopes above the Douglas-fir climax forest. Associated soils have a cryic temperature regime and pale brown or light yellowish brown surfaces. The grand fir climax forests occur as narrow stringers in close proximity to drainageways and rarely occur above 5,000 feet elevation. Associated soils have frigid temperature regimes and soil surface colors similar to the soils associated with the subalpine fir climax series. Because of position or drainage, these soils have more available moisture than surrounding soils. Engelmann spruce occasionally is the climax forest overstory component along the lower portion of the subalpine fir zone on soils with favorable moisture-holding capacity or where extra moisture is available from run-in or water table. Western redcedar and western hemlock can be found as small scattered stands in the unit in situations similar to grand fir. At the highest elevations of the unit, white bark becomes a significant associate of subalpine fir and may form climax forest stands. The Swan River Valley is included in this unit. In the Swan Valley, Douglas-fir or Engelmann spruce climax forests occur on the very gravelly droughty soils within the area and Engelmann spruce or subalpine fir occur on the finer textured soils within the unit or on soils in positions to receive supplemental moisture. Scattered climax stands of grand fir and western hemlock also occur within the valley on areas of favorable moisture. Elevational limits of this unit are 2,000-8,000 feet.

Typical overstory composition is:

Subalpine fir	55%
Douglas-fir	35%
Grand fir	10%

Dominants in the Climax Vegetation	Plants that Increase with Grazing Pressure
Subalpine fir	Pinegrass
Douglas-fir	Danthonia
Grand fir	Kentucky bluegrass
Engelmann spruce	Weedy forbs

57. Subalpine Fir, Douglas-fir, and Grand Fir Climax Forests (cont.)

Dominants in the Climax Vegetation

Blue huckleberry
Common snowberry
Common beargrass
Pinegrass
Rusty menziesia
Grouse whortleberry
Mallow ninebark
Twinflower
Smooth woodrush
Oceanspray
Queencup beadlily
Kinnikinnick
Saskatoon serviceberry
Snowbrush ceanothus

Plants that Increase with Grazing Pressure

Annuals
Common snowberry
Mallow ninebark
Woods rose

In this unit, with a loss of the climax forest overstory, lodgepole pine can occupy grand fir, Douglas-fir, and all but the upper limits of subalpine fir sites. Engelmann spruce may occur throughout the subalpine fir and grand fir zones. Douglas-fir can occupy a portion of the subalpine fir sites and grand fir sites. Ponderosa pine can occupy Douglas-fir and grand fir sites. Western larch can occupy the lower portions of subalpine fir sites and the grand fir sites. Western white pine is occasionally found on grand fir and the lower elevations of subalpine fir sites. Alpine larch may be found in some areas at the upper elevational limits of the unit with whitebark pine.

58. Western Redcedar and Western Hemlock Climax Forests on Deep Soils with Frigid Temperature Regimes. These Soils have Brown to Pale Brown or Light Gray Surfaces and Occur on Gently Sloping to Gently Rolling Valley Floors. Parent Materials are Generally Lacustrine Sediments, 20-35" P. Z.

Western redcedar climax forests occur on well-drained soils with clayey subsoils. Western hemlock climax forests occur as narrow stringers along streams or in pockets where the clayey soils are somewhat poorly and poorly drained. Grand fir occurs in areas where soils are well drained and subsoils have relatively low moisture-holding capacity or on soils on steep south and west facing slopes included within the unit. There does not seem to be a consistent relationships between soil surface color and the climax forest overstory vegetation within this unit. Elevational limits of the extent of this mapping unit are 2,000-2,500 feet.

58. Western Redcedar and Western Hemlock Climax Forests (cont.)

Typical overstory composition is:

Western redcedar	70%
Western hemlock	15%
Grand fir	15%

Dominants in the Climax Vegetation

Western redcedar
Western hemlock
Grand fir
Common snowberry
Twinflower
Queencup beadlily
Ferns
Blue huckleberry
Broadleaf arnica
Oregongrape
Saskatoon serviceberry
Western goldthread
White spiraea
Pacific yew
Coolwort foamflower
Myrtle pachistima
Wild sarsaparilla
Mallow ninebark
Trailplant
Oceanspray
Common beargrass
Western roundleaved violet
Sidebells wintergreen
Common pipsissewa
Mountain sweetroot
Sweetscented bedstraw
Western meadowrue
Roughleaf ricegrass
Woodland strawberry
Mountain brome
Devilsclub

Plants that Increase with Grazing Pressure

Quackgrass
Kentucky bluegrass
Weedy forbs
Common snowberry
Rose
Annuals
Ferns

In this forest complex, with a loss of the climax forest overstory, Douglas-fir, western larch, Engelmann spruce, western white pine, lodgepole pine, quaking aspen, and ponderosa pine can occupy sites within the unit. Ponderosa pine rarely occurs on the western hemlock sites, however.

59. Grand Fir and Douglas-fir Climax Forests on Deep Soils with Frigid Temperature Regimes. These Soils have Brown or Light Gray Surfaces and Occur on Steep to Very Steep Mountain Slopes. Soil Parent Materials are Primarily Derived from Quartzites and Argillites of the Belt Series, 25-60" P. Z.

Douglas-fir climax forests occur on primarily steep to very steep south and west facing slopes. Associated soils have a frigid temperature regime and light gray surfaces. It is also found on very gravelly droughty soils on terraces along drainageways. Grand fir climax forests occur on north and east facing slopes. Associated soils have a frigid temperature regime and brown or pale brown surfaces. Stringers of western redcedar and/or western hemlock are found throughout the unit following along water courses in favorable moisture situations. Associated soils are somewhat poorly or well drained and have brown surfaces and frigid temperature regimes. Elevational limits of the unit are 2,000-5,000 feet.

Typical overstory composition is:

Grand fir	45%
Douglas-fir	45%
Western redcedar Western hemlock	10%

Dominants in the Climax Vegetation

Grand fir
Douglas-fir
Western redcedar
Western hemlock
Engelmann spruce
Blue huckleberry
Common beargrass
Common snowberry
Mallow ninebark
Pinegrass
Myrtle pachistima
White spiraea
Twinflower
Heartleaf arnica
Kinnikinnick
Broadleaf arnica
Oceanspray
Elk sedge
Queencup beadlily
Saskatoon serviceberry
Oregongrape
Wild sarsaparilla

Plants that Increase with Grazing Pressure

Pinegrass
Common snowberry
Kentucky bluegrass
Mallow ninebark
Danthonia
Woods rose
Weedy forbs
Annuals

59. Grand Fir and Douglas-fir Climax Forests (cont.)

Dominants in the Climax Vegetation

Hooker fairybell
Western meadowrue

In this unit, with a loss of the climax forest overstory, ponderosa pine, western larch, and lodgepole pine can occupy Douglas-fir sites. On the grand fir and western redcedar-western hemlock sites, western larch, ponderosa pine, western white pine, lodgepole pine, and Engelmann spruce play seral roles. Ponderosa pine is rarely found on western hemlock sites.

60. Subalpine Fir Climax Forests on Deep Soils with Cryic Temperature Regimes. These Soils have Brown or Strong Brown Surfaces and Occur on Steep to Very Steep Mountain Slopes. Soil Parent Materials are Derived Primarily from Quartzites and Argillites of the Belt Series, 60-100" P. Z.

Subalpine fir climax forests occur throughout the unit except at the lower elevations on south and west facing slopes. Douglas-fir climax forests can occur at the lower elevational limits of the unit (5,000-5,500 feet) on south and west facing slopes. Mountain hemlock occupies mid elevation positions within the elevational range of the subalpine fir climax forests. Western redcedar, western hemlock, and grand fir climax forests occur as narrow stringers along drainageways at the lower elevational limits of the unit, and Engelmann spruce climax forests occur on similar positions at higher elevations. Elevational limits of the unit are 5,000-7,000 feet.

Typical overstory composition is:

Subalpine fir	70%
Mountain hemlock	20%
Douglas-fir	10%

Dominants in the Climax Vegetation

Subalpine fir
Mountain hemlock
Doulgas-fir
Blue huckleberry
Broadleaf arnica
Grouse whortleberry
Common beargrass
Rusty menziesia

60. Subalpine Fir Climax Forests (cont.)

Dominants in the Climax Vegetation

Myrtle pachistima
Myrtle whortleberry
Pinegrass
Twinflower
White spiraea
Elk sedge
Smooth woodrush
Common snowberry
Saskatoon serviceberry
Western roundleaved violet
Bluejoint

In this unit, with a loss of the climax forest overstory, western larch, and lodgepole pine can occupy Douglas-fir climax forest sites. Western larch, western white pine, Douglas-fir, Engelmann spruce, and lodgepole pine can occupy subalpine fir and mountain hemlock sites on soils within the lower 2/3 of the unit. At the higher elevations of the unit, Engelmann spruce, lodgepole pine, and whitebark pine are the only species playing a seral role. Near timberline, whitebark pine and alpine fir may form climax forest stands.

61. Hardwood Climax Forests on Alluvial Floodplains Along Major Rivers. Soils are Shallow to Deep, Well Drained to Poorly Drained with Frigid Temperature Regimes.

Typical overstory composition is:

East of Continental Divide:	Cottonwood	80%
	Other hardwoods	20%
West of Continental Divide:	Cottonwood	80%
	Conifers	20%

The climax forest overstory of this unit east of the Continental Divide is primarily plains cottonwood. Narrowleaf cottonwood climax forests are found on very gravelly shallow soils. Green ash and boxelder climax stands are found randomly scattered throughout the unit. West of the Continental Divide, plains cottonwood climax forest stands predominate. Climax stands of western black cottonwood and conifers, primarily ponderosa pine, can also occur within the unit as scattered stands.

61. Hardwood Climax Forests (cont.)

Dominants in the Understory Vegetation*

Willows
Redosier dogwood
Rocky Mountain juniper
Silverberry
Snowberry
Common chokecherry
Woods rose
Silver buffaloberry
Russet buffaloberry
Western wheatgrass
Green needlegrass
Prairie cordgrass
Basin wildrye
Tall reedgrass
Bearded wheatgrass
Slender wheatgrass
Native clovers
Sedges

Plants that Increase with Grazing Pressure

Snowberry
Woods rose
Sedges
Golden pea
Silver buffaloberry
Silverberry
Sandberg bluegrass
Western wheatgrass
Needleandthread
Silver sagebrush

*Plants are not listed in order of dominance.

East of the Continental Divide, green ash, Rocky Mountain juniper, boxelder, and Russian-olive can move throughout most of the climax cottonwood forest stands when there is not frequent enough flooding to perpetuate cottonwood. West of the Continental Divide, coniferous forest of primarily ponderosa pine can occupy cottonwood climax forest sites if there is not frequent enough flooding to perpetuate western black and plains cottonwood.

62. Rockland and Mixed High Elevation Vegetation Consisting of Forests, Krummholz, and Alpine Areas Growing on Shallow to Deep, Very Gravelly or Very Cobbly, and Stony Soils with Cryic Temperature Regimes. Elevational Limits are 5,000-11,000 Feet, 40-110" P. Z.

Typical composition is:

Rockland	70%
Vegetation	30%

Well formed forest vegetation occurs on deep soils in glacial cirque basins included within the unit. Alpine vegetation can be found on sloping to steep windswept mountains above timberline on deep to moderately deep soils. The krummholz occurs in between the forest and alpine on windswept areas where trees become stunted and deformed. Soils are shallow to deep. Occasionally, this unit includes rock outcrop areas well within the general forest zone.

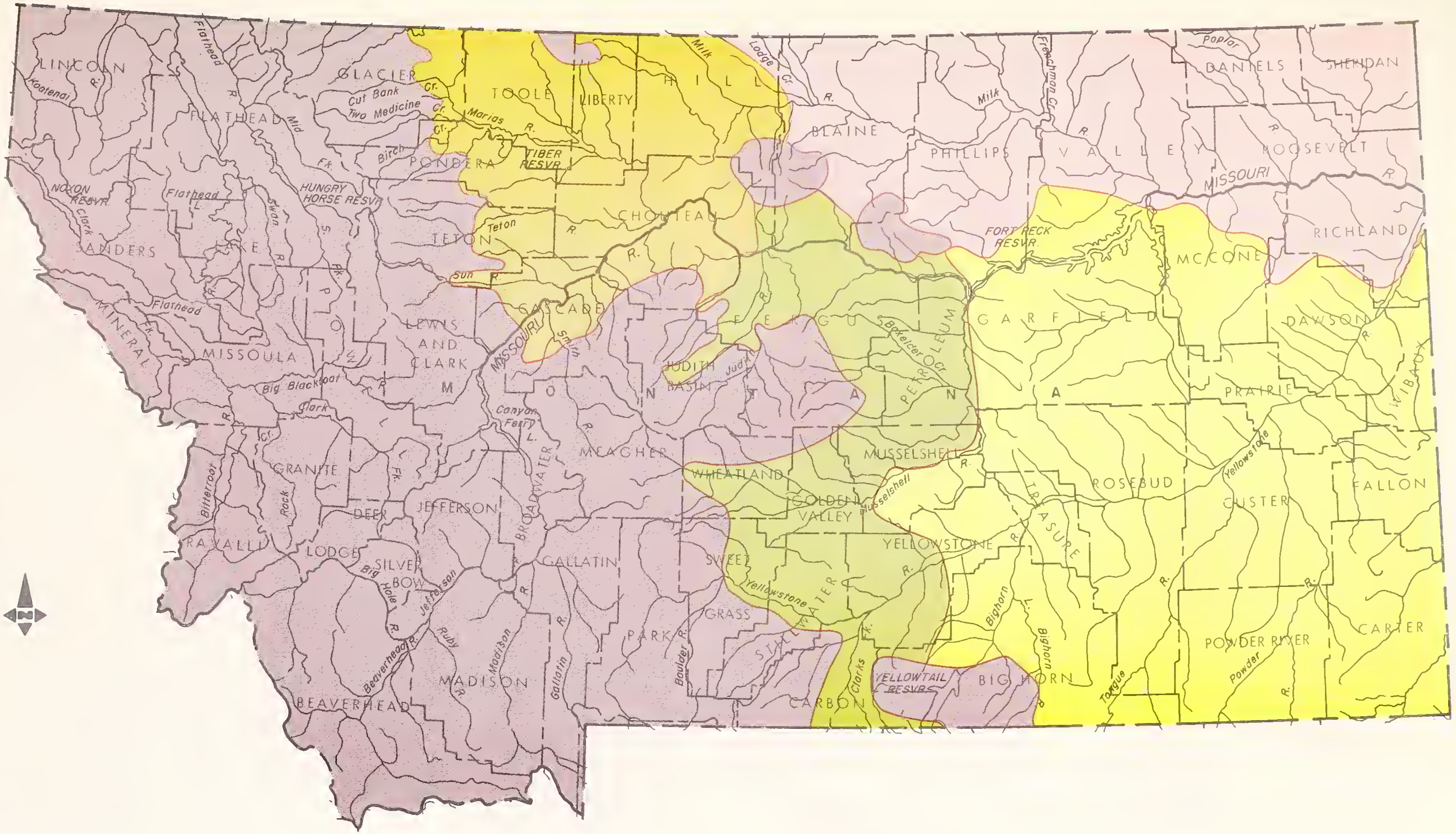
62. Rockland and Mixed High Elevation Vegetation (cont.)

Dominants in the
Climax Vegetation*

- Subalpine fir
- Whitebark pine
- Limber pine
- Mountain hemlock
- Alpine larch
- Sheep fescue
- Slender wheatgrass
- Bluebunch wheatgrass**
- Alpine bluegrass
- Red mountainheath
- Phlox
- Pussytoes
- Forgetmenot
- Stonecrop
- Groundsel
- Gordon ivesia
- Elphanthead pedicularis
- Moss silene
- White dryad

*Plants are not listed in order of dominance.
**Below 6,000 feet

SUPPORTING INFORMATION



GEOGRAPHICAL AREAS

- Eastern Glaciated Plains
- Western Glaciated Plains
- Eastern Sedimentary Plains
- Western Sedimentary Plains
- Foothills & Mountains

GEOGRAPHICAL AREAS
FOR TECHNICIANS GUIDES TO RANGE SITES AND CONDITION CLASSES
MONTANA

AUGUST 1976

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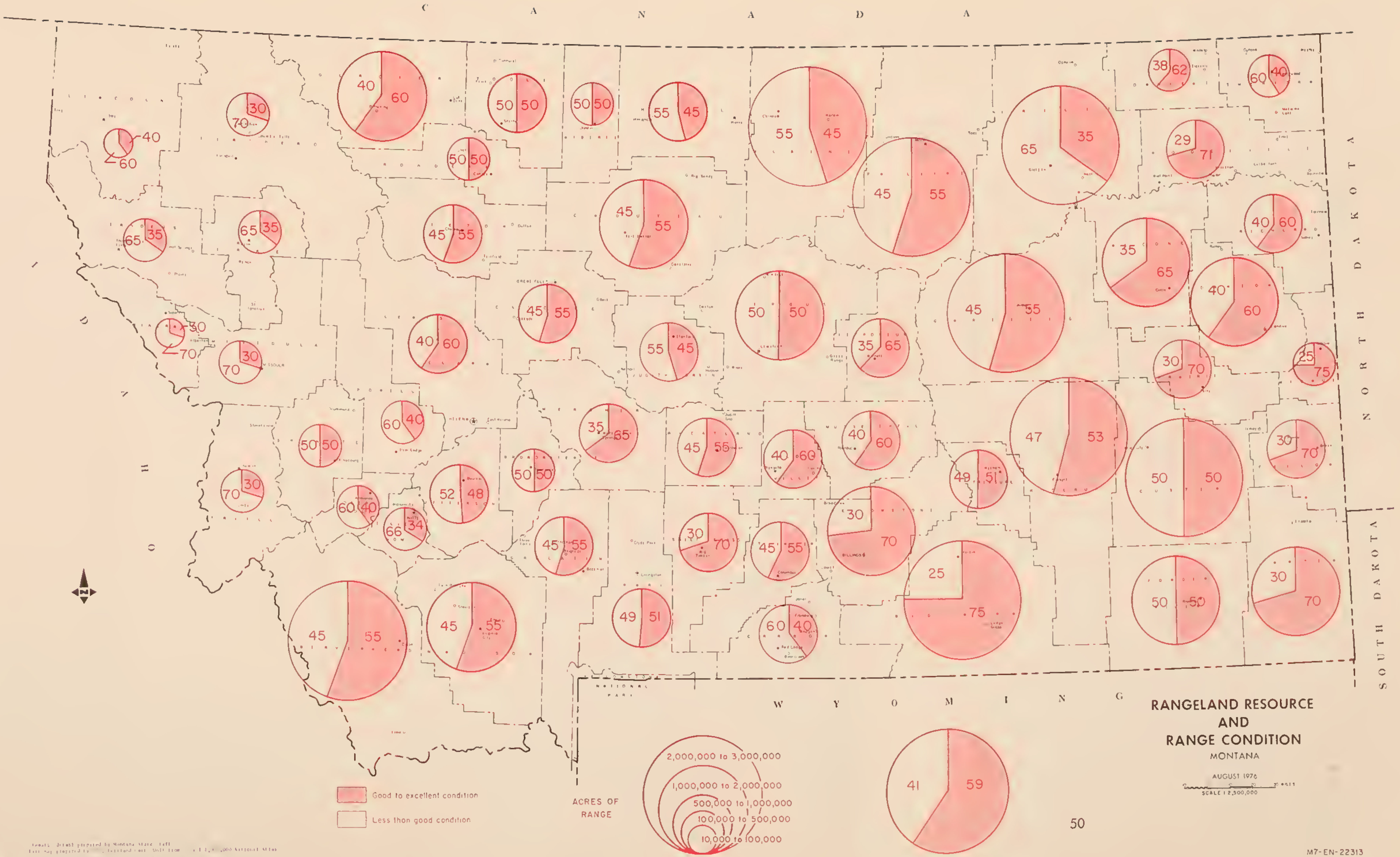
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE USDA-SCS-PORTLAND, OR 1976



RANGELAND RESOURCE AND RANGE CONDITION

MONTANA

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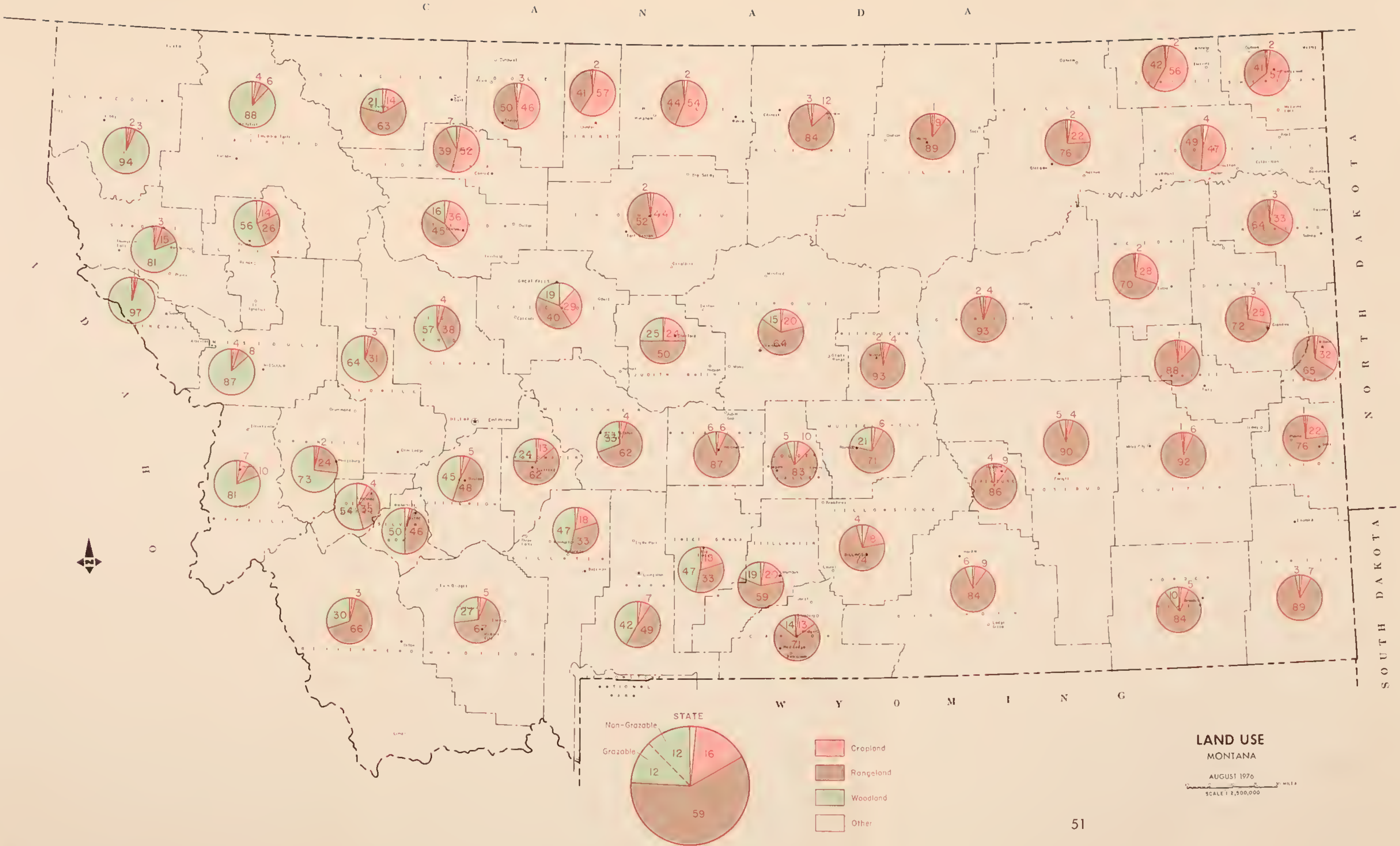

LAND USE

MONTANA

AUGUST 1976

SCALE 1:2,500,000

Thematic detail prepared by Montana State staff
Base map prepared by SCS, Portland Carto Unit from USGS 1:1,000,000 National atlas
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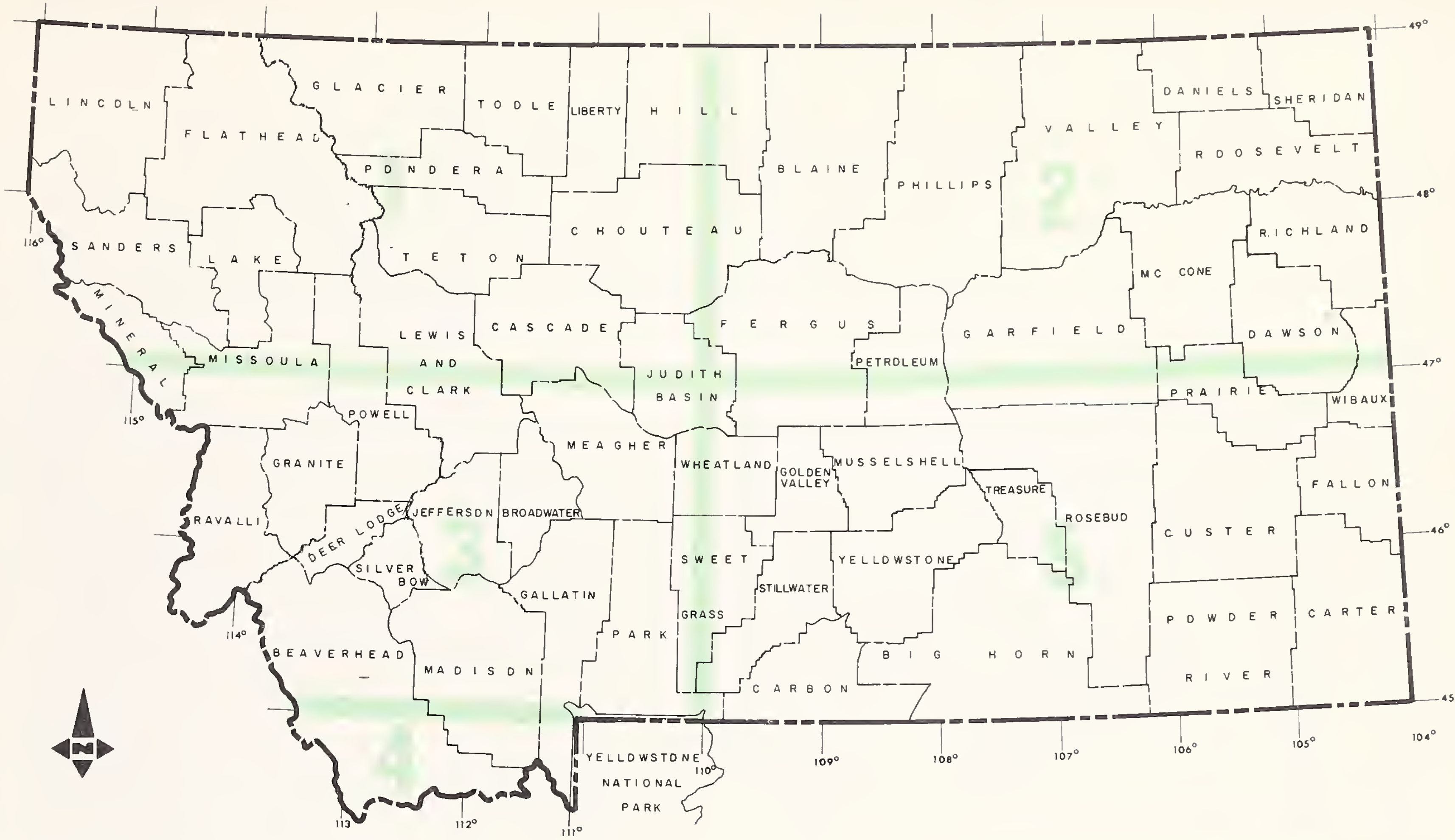

MONTANA

AUGUST 1976

50 0 50 100 MILES

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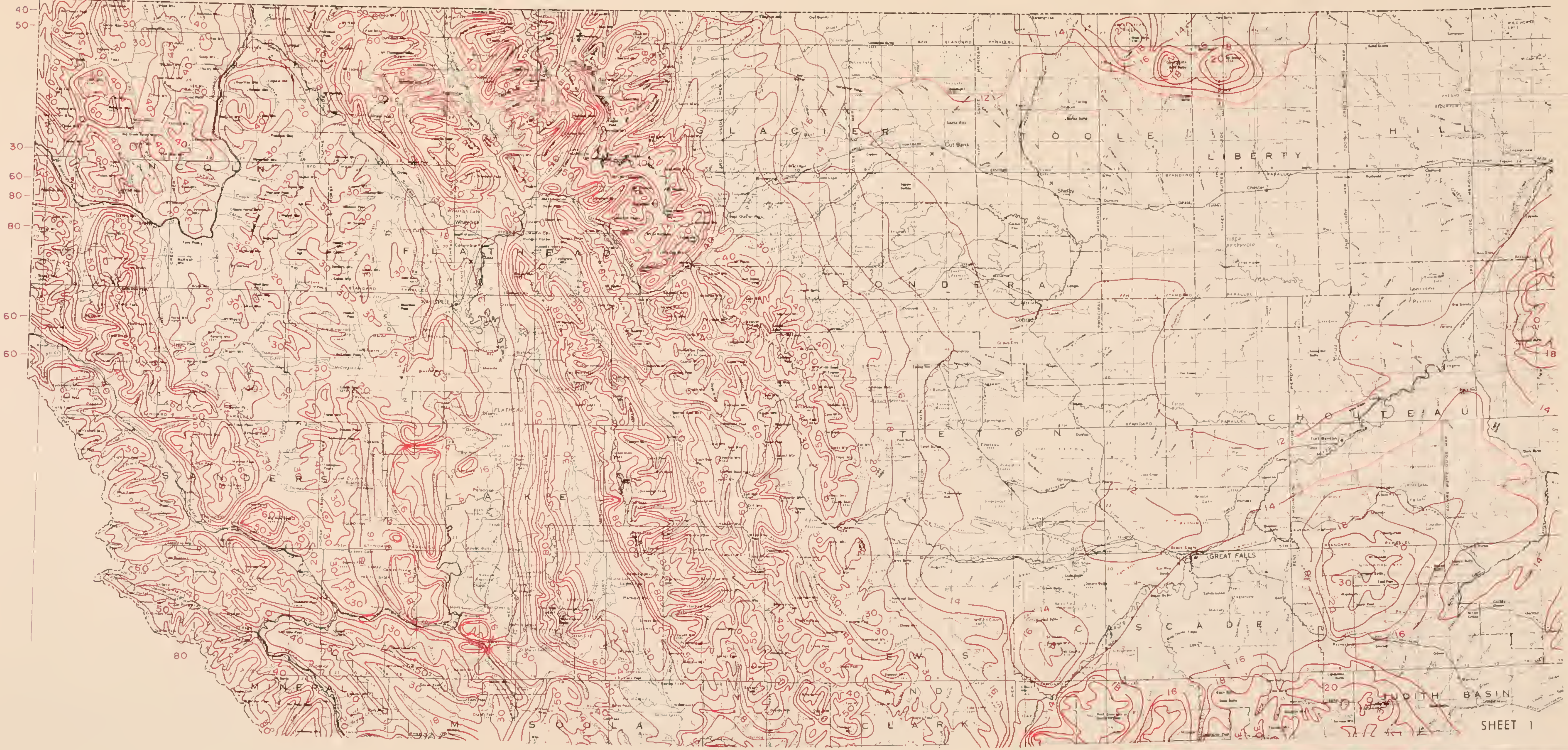

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Prepared by: SCS, Box 970, Bozeman, MT.

STATE OF MONTANA
AVERAGE ANNUAL PRECIPITATION
IN INCHES

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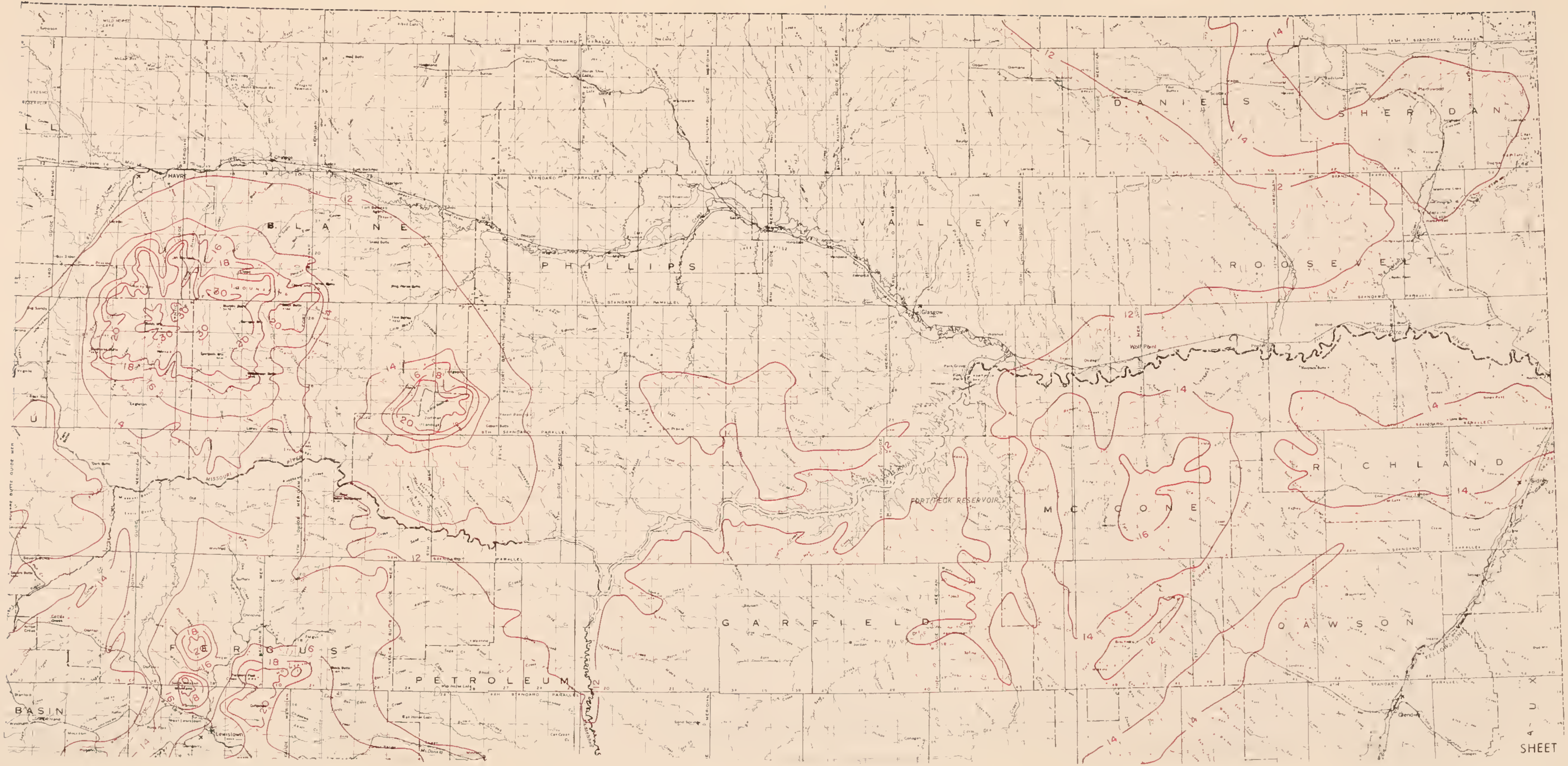

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Prepared by: SCS, Box 970, Bozeman, MT.

STATE OF MONTANA
AVERAGE ANNUAL PRECIPITATION IN INCHES

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SCALE 1:1,000,000

M7-N-23679

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Base map prepared by SCS, Portland Carto Unit from USGS 1:1,000,000.
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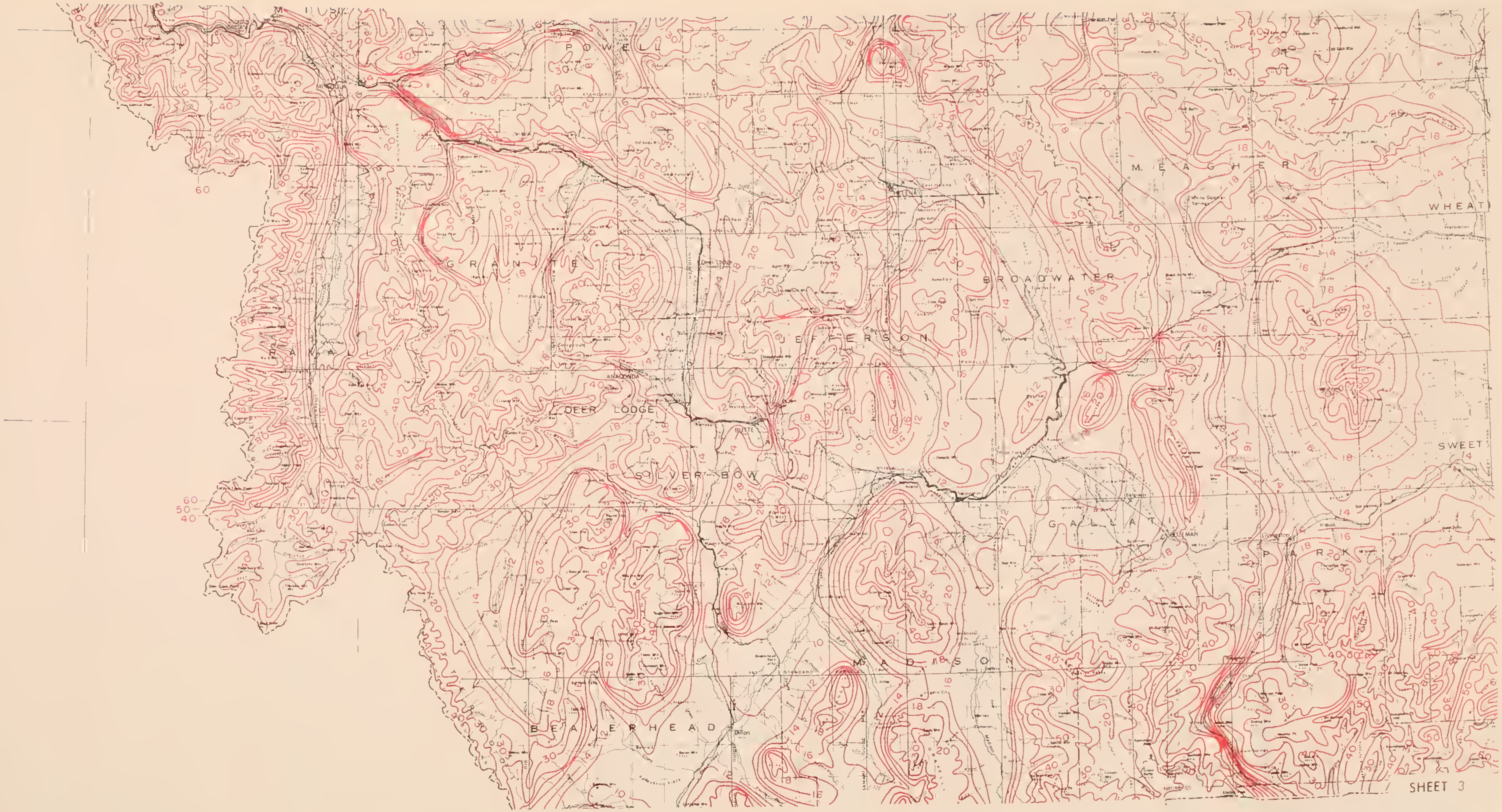

SHEET 3

Source:
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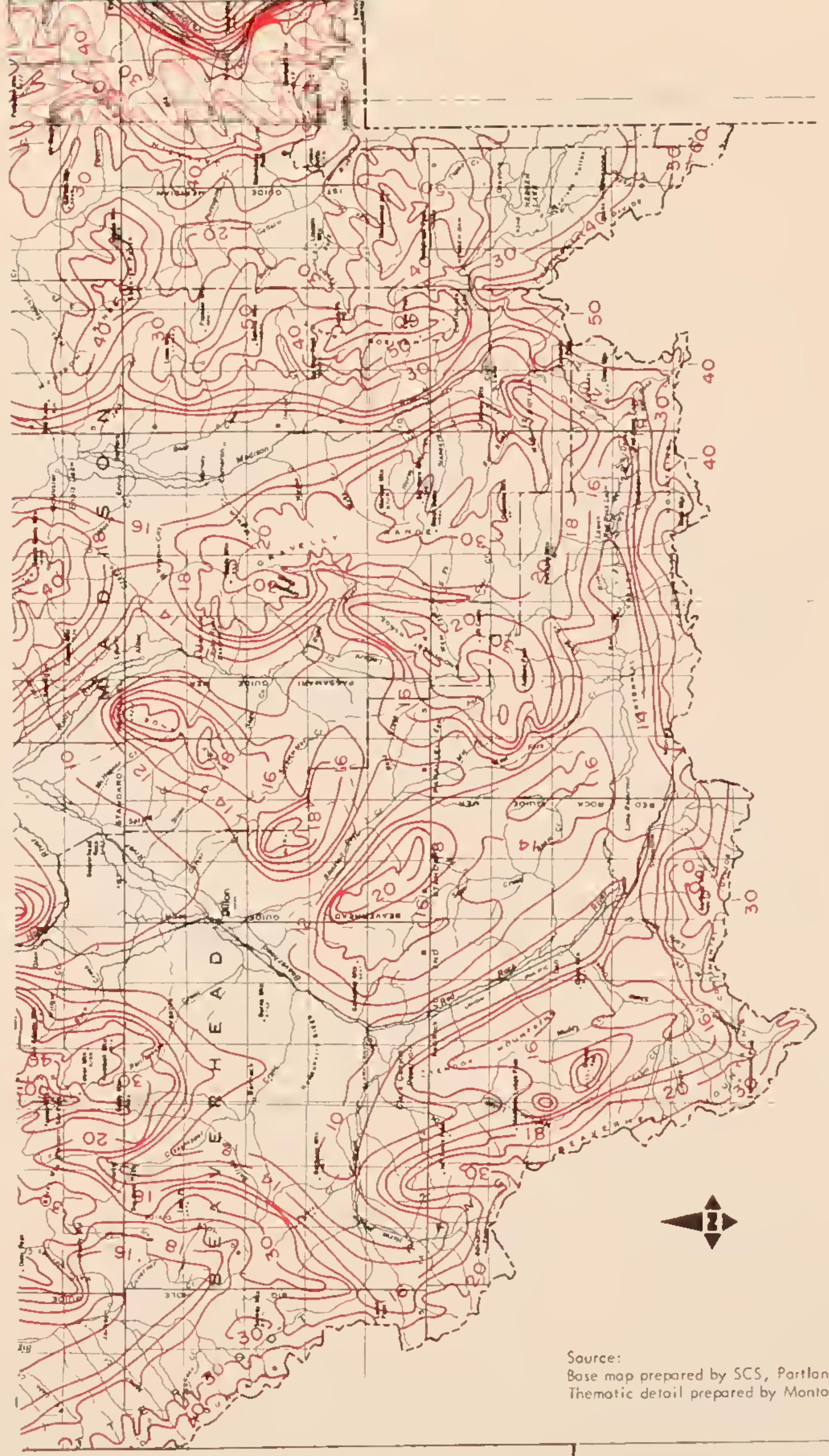
STATE OF MONTANA
AVERAGE ANNUAL PRECIPITATION
IN INCHES

10 0 10 20 MILES
SCALE 1:1,000,000

M7-N-23679



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SHEET 4

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STATE OF MONTANA
AVERAGE ANNUAL PRECIPITATION
IN INCHES

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SCALE 1:1,000,000

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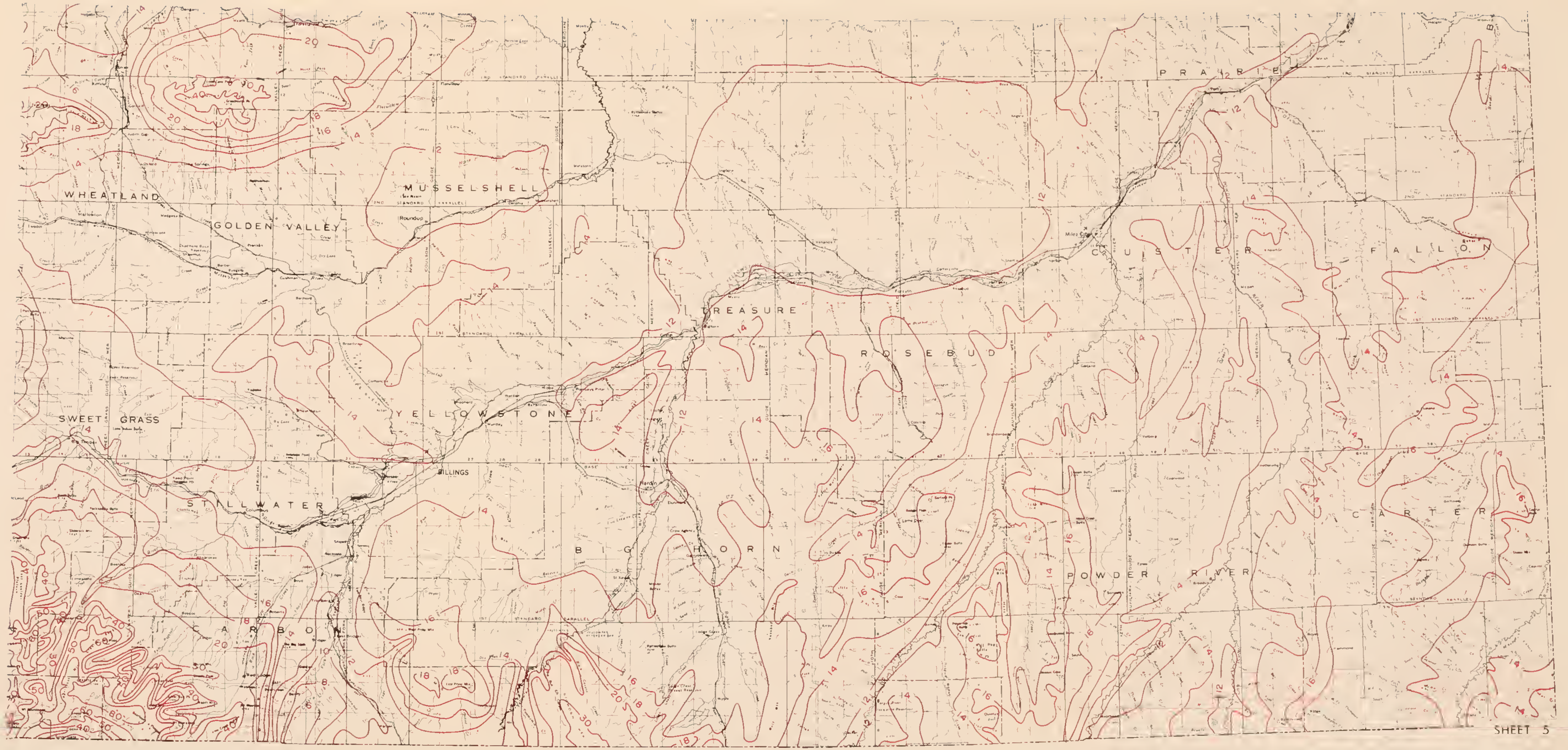

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STATE OF MONTANA
AVERAGE ANNUAL PRECIPITATION
IN INCHES

10 0 10 20 MILES
SCALE 1:1,000,000

M7-N-23679

PLANT NAME LIST

Grass and Grasslike

Alkali cordgrass	Spartina gracilis
Alkali sacaton	Sporobolus airoides
Alpine bluegrass	Poa alpina
Alpine timothy	Phleum alpinum
American mannagrass	Glyceria grandis
American vetch	Vicia americana
Baltic rush	Juncus balticus
Basin wildrye	Elymus cinereus
Bearded wheatgrass	Agropyron subsecundum
Big bluegrass	Poa ampla
Bluebunch wheatgrass	Agropyron spicatum
Blue grama	Bouteloua gracilis
Bluejoint	Calamagrostis canadensis
Blue wildrye	Elymus glaucus
Buffalograss	Buchloe dactyloides
Canada wildrye	Elymus canadensis
Canby bluegrass	Poa canbyi
Columbia needlegrass	Stipa columbiana
Cusick bluegrass	Poa cusickii
Elk sedge	Carex geyeri
Foxtail barley	Hordeum jubatum
Green needlegrass	Stipa viridula
Idaho fescue	Festuca idahoensis
Indian ricegrass	Oryzopsis hymenoides
Inland saltgrass	Distichlis stricta
Kentucky bluegrass	Poa pratensis
Little bluestem	Andropogon scoparius
Low sedges	Carex species
Meadow barley	Hordeum brachyantherum
Mountain brome	Bromus marginatus
Needleandthread	Stipa comata
Nodding brome	Bromus anomalus
Nuttall alkaligrass	Puccinellia airoides
Onespike danthonia	Danthonia unispicata
Parry danthonia	Danthonia parryi
Pinegrass	Calamagrostis rubescens
Plains muhly	Muhlenbergia cuspidata
Plains reedgrass	Calamagrostis montanensis
Porcupinegrass	Stipa spartea
Prairie cordgrass	Spartina pectinata
Prairie junegrass	Koeleria cristata
Prairie sandreed	Calamovilfa longifolia
Poverty danthonia	Danthonia spicata
Purple oniongrass	Melica spectabilis
Purple reedgrass	Calamagrostis purpurascens
Quackgrass	Agropyron repens
Red threeawn	Aristida longiseta
Redtop	Agrostis alba

Grass and Grasslike (Continued)

Richardson needlegrass	Stipa richardsoni
Rough fescue	Festuca scabrella
Roughleaf ricegrass	Oryzopsis asperifolia
Sand bluestem	Andropogon hallii
Sandberg bluegrass	Poa secunda
Sand dropseed	Sporobolus cryptandrus
Scratchgrass	Muhlenbergia asperifolia
Sheep fescue	Festuca ovina
Sideoats grama	Bouteloua curtipendula
Slender wheatgrass	Agropyron trachycaulum
Smooth woodrush	Luzula glabrata
Spikefescue	Hesperochloa kingii
Spike trisetum	Trisetum spicatum
Sun sedge	Carex heliophila
Bottlebrush squirreltail	Sitanion hystrix
Tall reedgrasses	Calamagrostis species
Tall sedges	Carex species
Thickspike wheatgrass	Agropyron dasystachyum
Threadleaf sedge	Carex filifolia
Timber danthonia	Danthonia intermedia
Timothy	Phleum pratense
Tufted hairgrass	Deschampsia caespitosa
Tumblegrass	Schedonnardus paniculatus
Western wheatgrass	Agropyron smithii

Forbs

Alpine bluebells	Mertensia alpina
American bistort	Polygonum bistortoides
American licorice	Glycyrrhiza lepidota
American vetch	Vicia americana
Arrowleaf balsamroot	Balsamorhiza sagittata
Belvedere summercypress (Kochia)	Kochia scoparia
Biscuitroot	Lomatium foeniculaceum
Broadleaf arnica	Arnica latifolia
Burclover	Medicago hispida
Cinquefoil forbs	Potentilla species
Common beargrass	Xerophyllum tenax
Common blue-eyedgrass	Sisyrinchium angustifolium
Coolwart foamflower	Tiarella unifoliata
Creeping silene	Silene repens
Curlycup gumweed	Grindelia squarrosa
Deathcamas	Zygadenus species
Elephanthead pedicularris	Pedicularis groenlandica
Eriogonum	Eriogonum species
Field horsetail	Equisetum arvense
Forgetmenot	Myosotis species
Gordon ivesia	Ivesia gordonii
Groundsel	Senecio foetidus
Hairy goldenaster	Chrysopsis (Heterotheca) villosa
Heartleaf arnica	Arnica cordifolia
Hooker fairybells	Disporum hookeri
Indianpaintbrush	Castilleja
Lupine	Lupinus species
Milkvetch	Astragalus species
Monkeyflower	Mimulus species
Mountain thermopsis	Thermopsis montana
Mulesear wyethia	Wyethia amplexicaulis
Native clovers	Trifolium species
Nuttall monolepis	Monolepis nuttalliana
Onion	Allium species
Phlox	Phlox species
Poverty sumpweed	Iva axillaris
Prairiesmoke	Geum triflorum
Pussytoes	Antennaria species
Queencup beadlily	Clintonia uniflora
Rocky Mountain iris	Iris missouriensis
Scarlet globemallow	Sphaeralcea coccinea
Scurfpea	Psoralea species
Seepweed (Suaede)	Suaeda species
Shore arrowgrass	Triglochin maritima
Sidebells wintergreen	Pyrola secunda
Sticky geranium	Geranium viscosissimum
Tall larkspur	Delphinium occidentale
Thistles	Cirsium species

Forbs (Continued)

Trailplant	Adenocaulon bicolor
Tufted phlox	Phlox caespitosa
Western goldthread	Coptis occidentalis
Western meadowrue	Thalictrum occidentale
Western roundleaved violet	Viola orbiculata
Western yarrow	Achillea millefolium
White pointloco	Oxytropis sericea
Wild saraparilla	Aralia nudicaulis
Wood lily	Lilium philadelphicum
Woodland strawberry	Fragaria vesca
Yellow avens	Geum rossii

Shrubs

Big sagebrush	Artemisia tridentata
Black sagebrush	Artemisia arbuscula nova
Blue huckleberry	Vaccinium globulare
Bud sagebrush	Artemisia spinescens
Chokecherry	Prunus virginiana
Common pipsissewa	Chimaphila umbellata
Creeping juniper	Juniperus horizontalis
Curlleaf mountainmahogany	Cercocarpus ledifolius
Devilsclub	Oplopanax horridum
Dwarf huckleberry	Vaccinium caespitosum
Fourwing saltbush	Atriplex canescens
Gray horsebrush	Tetradymia canescens
Greasewood	Sarcobatus vermiculatus
Grouse whortleberry	Vaccinium scoparium
Kinnikinnick	Arctostaphylos uva-ursi
Mallow ninebark	Physocarpus malvaceus
Myrtle whortleberry	Vaccinium myrtillus
Nuttal saltbush	Atriplex nuttallii
Oceanspray	Holodiscus discolor
Oregongrape	Berberis repens
Pacific yew	Taxus brevifolia
Rabbitbrush	Chrysothamnus species
Red mountainheath	Phyllodoce empetriformis
Rocky Mountain juniper	Juniperus scopulorum
Rose species	Rosa species
Russet buffaloberry	Shepherdia canadensis
Rusty menziesia	Menziesia ferruginea
Saskatoon serviceberry	Amelanchier alnifolia
Scouler willow	Salix scouleriana
Shadscale saltbush	Atriplex confertifolia
Shrubby cinquefoil	Potentilla fruticosa
Skunkbush sumac	Rhus trilobata
Snowberry	Symphoricarpos species
Snowbrush ceanothus	Ceanothus veluntinus
Silverberry	Elaeagnus commutata
Silver buffaloberry	Shepherdia argentea
Silver sagebrush	Artemisia cana
Twinflower	Linnaea borealis
Utah honeysuckle	Lonicera utahensis
Utah juniper	Juniperus osteosperma
White dryad	Dryas octopetala
White spiraea	Spiraea betulifolia
Willows	Salix species
Winterfat	Eurotia lanata
Wolf willow	Salix wolfii
Woods rose	Rosa woodsii
Yucca	Yucca glauca

Trees

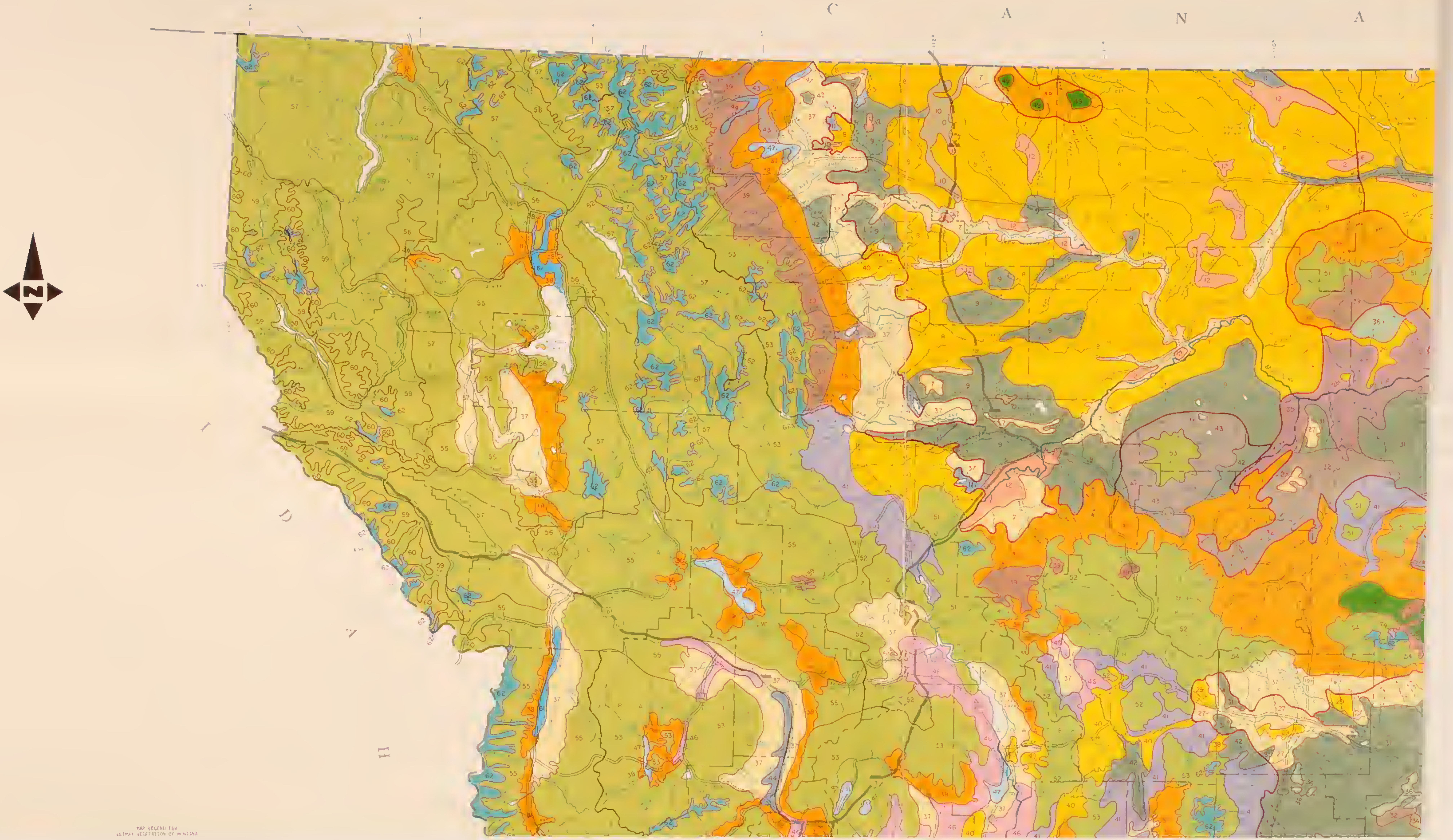
Alpine larch	Larix lyalli
Boxelder	Acer negundo
Cottonwood (plains)	Populus sargentii
Douglas-fir	Pseudotsuga menziesii glauca
Engelmann spruce	Picea engelmannii
Grand fir	Abies grandis
Limber pine	Pinus flexilis
Lodgepole pine	Pinus contorta latifolia
Myrtle pachistima	Pachistima myrsinites
Ponderosa pine	Pinus ponderosa
Quaking aspen	Populus tremuloides
Rocky Mountain maple	Acer glabrum
Subalpine fir	Abies lasiocarpa
Western hemlock	Tsuga heterophylla
Western larch	Larix occidentalis
Western redcedar	Thuja plicata
Western white pine	Pinus monticola
Whitebark pine	Pinus albicaulis
White spruce	Picea glauca

Mosses

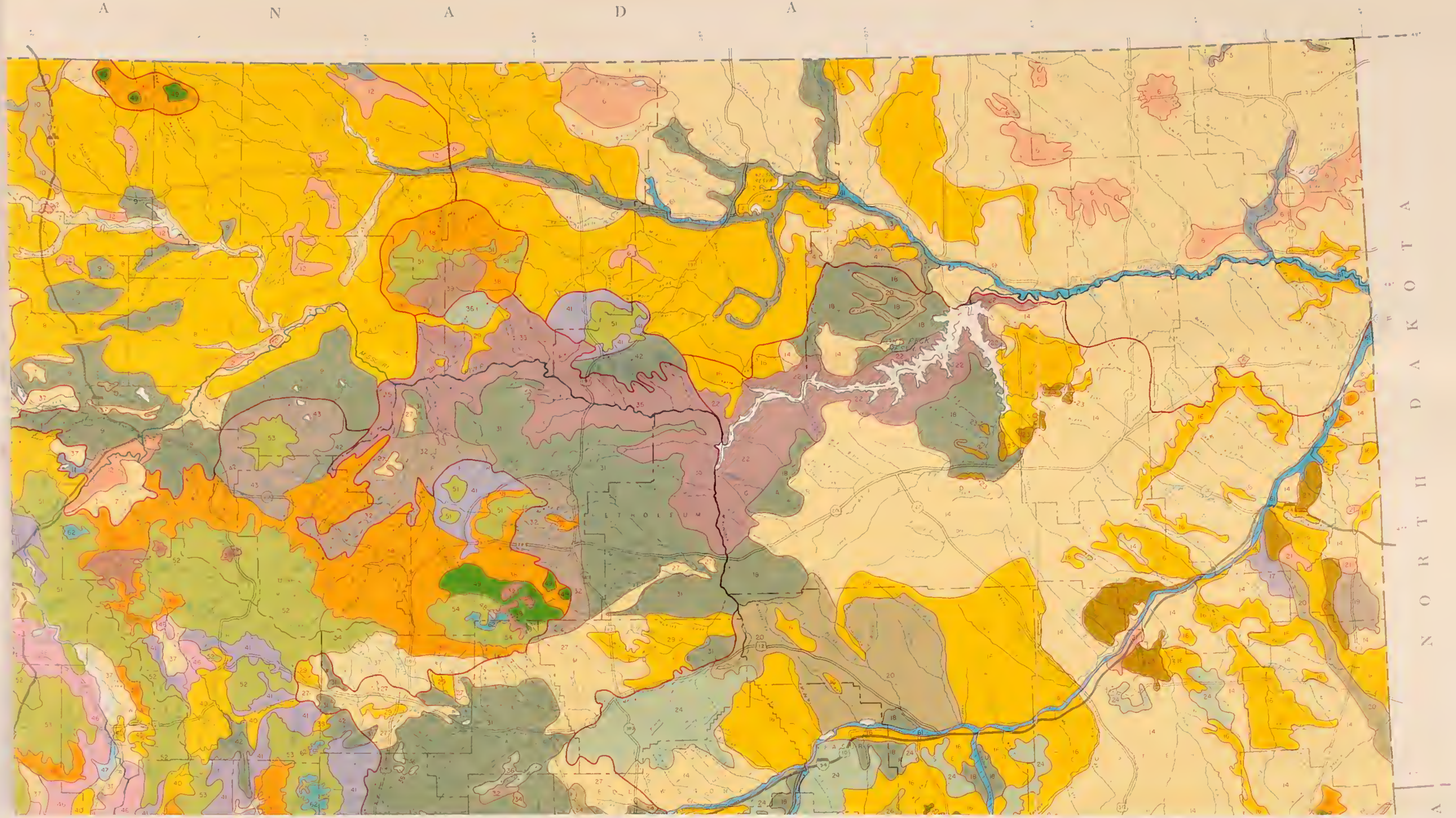
Clubmoss	Selaginella densa
Moss silene	Silene acaulis

Ferns

Ferns	Polypody species



MAP LEGEND FOR
CLIMAX VEGETATION OF MONTANA


ANADA
NORTH DAKOTA
MISSOURI
FORT PECK RESVR.
PETROLEUM
RICHLAND

MAP LEGEND FOR
CLIMAX VEGETATION OF MONTANA

(Plant species listed in order of dominance.)

EASTERN GLACIATED PLAINS

1 Silty Range Site, 10-14" Precipitation Zone (P.Z.)

(Includes thin breaks too small or irregular to delineate) Needleandthread, western and thickspike wheatgrass, green needlegrass, little bluestem, prairie junegrass, porcupinegrass, blue grama, native legumes, silver sagebrush, western snowberry, winterfat

2 Silty-Clayey Range Site Complex, 10-14" P.Z.

Silty: Same as Site No. 1

Clayey: Same as Site No. 3

3 Clayey and Shallow Clay Range Site Association, 10-14" P.Z.

Western and thickspike wheatgrass, green needlegrass, little bluestem, prairie junegrass, plains reedgrass, biscuitroot, milkvetches, American vetch, silver sagebrush, winterfat

4 Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P.Z.

Dense Clay: western and thickspike wheatgrass, green needlegrass, prairie junegrass, big sagebrush, Nuttall saltbush, greasewood

Clayey: Same as Site No. 3

Saline Upland: Alkali sacaton, western and thickspike wheatgrass, greasewood, Nuttall saltbush, inland saltgrass, bottlebrush squirreltail, Sandberg bluegrass

5 Saline Lowland Range Site, 10-14" P.Z.

Western and thickspike wheatgrass, alkali sacaton, alkali cordgrass, slender wheatgrass, Nuttall alkaligrass, inland saltgrass, Canada wildrye, sedge, greasewood, Nuttall saltbush

6 Sands and Sandy Range Site Association, 10-14" P.Z.

Sands: Prairie sandreed, needleandthread, Indian ricegrass, little bluestem, sand bluestem, sun sedge, native legumes, skunkbush sumac

Sandy: Needleandthread, prairie sandreed, threadleaf sedge, little bluestem, sideoats grama, western and thickspike wheatgrass, native legumes, blue grama, skunkbush sumac, rose

WESTERN GLACIATED PLAINS

7 Silty Range Site, 10-14" P.Z.

Needleandthread, western and thickspike wheatgrass, green needlegrass, bluebunch wheatgrass, basin wildrye, prairie junegrass, native legumes, silver sagebrush, blue grama

8 Silty-Clayey Range Site Complex, 10-14" P.Z.

Silty: Same as Site No. 7

Clayey: Same as Site No. 9

9 Clayey and Shallow Clay Range Site Association, 10-14" P.Z.

Green needlegrass, western and thickspike wheatgrass, bluebunch wheatgrass, needleandthread, prairie junegrass, plains reedgrass, milkvetches, scarlet globemallow, winterfat, prairie sandreed

10 Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P.Z.

Dense Clay: Western and thickspike wheatgrass, green needlegrass, basin wildrye, prairie junegrass, Nuttall saltbush, greasewood

Clayey: Same as Site No. 9

Saline Upland: Alkali sacaton, western and thickspike wheatgrass, greasewood, basin wildrye, Nuttall saltbush, inland saltgrass, bottlebrush squirreltail, Sandberg bluegrass

11 Saline Lowland Range Site, 10-14" P.Z.

Alkali sacaton, western and thickspike wheatgrass, Nuttall alkaligrass, alkali cordgrass, slender wheatgrass, inland saltgrass, sedge, greasewood, Nuttall saltbush

12 Sands and Sandy Range Site Association, 10-14" P.Z.

Sands: Prairie sandreed, needleandthread, Indian ricegrass, threadleaf sedge, native legumes, yucca, skunkbush sumac

Sandy: Needleandthread, prairie sandreed, threadleaf sedge, bluebunch wheatgrass, western and thickspike wheatgrass, native legumes, skunkbush sumac, blue grama

13 Subirrigated and Wetland Range Site Association

Tall reedgrasses, tufted hairgrass, slender and bearded wheatgrass, northern mannagrass, prairie cordgrass, tall sedges, basin wildrye, Canada wildrye, willows, cottonwood, box-elder

EASTERN SEDIMENTARY PLAINS

14 Silty Range Site, 10-14" P.Z.

(Includes thin breaks too small or irregular to delineate) western and thickspike wheatgrass, little bluestem, needleandthread, green needlegrass, bluebunch wheatgrass, big bluestem, prairie junegrass, threadleaf sedge, native legumes, silver sagebrush, skunkbush sumac, winterfat, blue grama, western snowberry

5 Silty Range Site, 15-19" P.Z.

Western and thickspike wheatgrass, green needlegrass, little bluestem, big bluestem, bluebunch wheatgrass, Idaho fescue, sideoats grama, native legumes, needleandthread, prairie junegrass, silver sagebrush

16 Silty-Clayey Range Site Complex, 10-14" P.Z.

(Includes thin breaks too small or irregular to delineate)

Silty: Same as Site No. 14

Clayey: Same as Site No. 18

17 Silty-Clayey Range Site Complex, 15-19" P.Z.

Silty: Same as Site No. 15

Clayey: Same as Site No. 19

18 Clayey and Shallow Clay Range Site Association, 10-14" P.Z.

western and thickspike wheatgrass, green needlegrass, little bluestem, bluebunch wheatgrass, prairie junegrass, native legumes, big sagebrush, Nuttall saltbush, winterfat

19 Clayey and Shallow Clay Range Site Association, 15-19" P.Z.

Green needlegrass, western and thickspike wheatgrass, bluebunch wheatgrass, basin wildrye, big bluestem, little bluestem, Idaho fescue, prairie junegrass, prairie sandreed, native legumes, big sagebrush, Nuttall saltbush, winterfat

20 Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P.Z.

Dense Clay: Western and thickspike wheatgrass, green needlegrass, basin wildrye, big sagebrush, Nuttall saltbush, greasewood, prairie junegrass

Clayey: Same as Site No. 18

Saline Upland: Alkali sacaton, western and thickspike wheatgrass, greasewood, basin wildrye, Nuttall saltbush, inland saltgrass, bottlebrush squirreltail, Sandberg bluegrass

21 Sands and Sandy Range Site Association, 10-14" P.Z.

Sands: Prairie sandreed, needleandthread, sand bluestem, Indian ricegrass, little bluestem, sun sedge, native legumes, skunkbush sumac, yucca

Sandy: Needleandthread, prairie sandreed, threadleaf sedge, little bluestem, sideoats grama, big bluestem, native legumes, blue grama, skunkbush sumac, rose

22 Riverbreaks, 10-14" P.Z.

Ponderosa pine, Rocky Mountain juniper, western and thickspike wheatgrass, bluebunch wheatgrass, green needlegrass, prairie sandreed, little bluestem, greasewood, big sagebrush, needleandthread, Nuttall saltbush, basin wildrye, native legumes, shadscale saltbush, creeping juniper

23 Badlands, 10-14" P.Z.

Western and thickspike wheatgrass, green needlegrass, little bluestem, bluebunch wheatgrass, prairie sandreed, alkali sacaton, prairie junegrass, Nuttall saltbush, big sagebrush, American vetch, plains muhly, sideoats grama, greasewood, juniper

24 Forest-Grassland Complex, 12-14" P.Z., on Very Shallow to Deep Soils with a Frigid Temperature Regime and Light Brown, Loamy Surfaces on Rolling to Hilly Terrain

Forest (50%) Ponderosa pine, Rocky Mountain juniper, little bluestem, bluebunch wheatgrass, sideoats grama, skunkbush sumac, western wheatgrass, native legumes

Grassland (50%) Little bluestem, needleandthread, western wheatgrass, green needlegrass, bluebunch wheatgrass, prairie sandreed, big bluestem, native legumes, skunkbush sumac, yucca, prairie junegrass, blue grama

25 Forest-Grassland Complex, 15-19" P.Z., on Very Shallow to Deep Soils with a Frigid Temperature Regime and Light Brown, Loamy Surfaces on Undulating to Hilly Terrain

Forest (60%) Ponderosa pine, bluebunch wheatgrass, Idaho fescue, little bluestem, sideoats grama, snowberry, native legumes, arrowleaf balsamroot, green needlegrass, common chokecherry, saskatoon serviceberry

Grassland (40%) Big bluestem, bluebunch wheatgrass, western wheatgrass, green needlegrass, needleandthread, prairie junegrass, basin wildrye, lupine, snowberry, saskatoon serviceberry, common chokecherry

26 Ponderosa Pine Forests on Moderately Deep to Deep Soils with a Frigid Temperature Regime and Light Brown to Brown Surfaces on Undulating to Steep Terrain, 15-19" P.Z.

Typical overstory composition is Ponderosa pine 100%

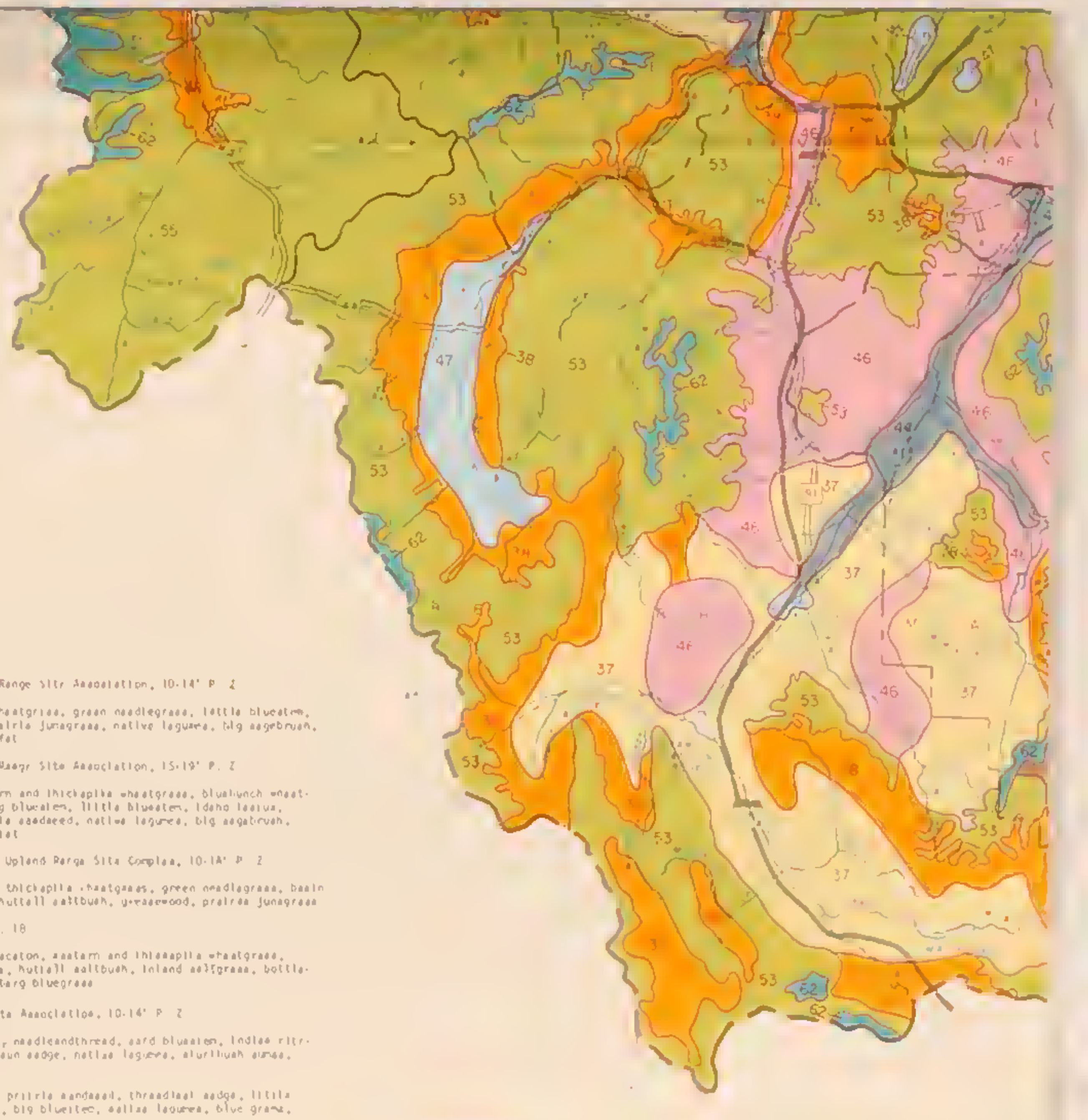
WESTERN SEDIMENTARY PLAINS

27 Silty Range Site, 10-14" P.Z.

Bluebunch wheatgrass, western and thickspike wheatgrass, needleandthread, green needlegrass, basin wildrye, threadleaf sedge, prairie junegrass, native legumes, big and silver sagebrush, skunkbush sumac, common chokecherry, blue grama

8 Silty Range Site, 15-19" P.Z.

Bluebunch wheatgrass, western and thickspike wheatgrass, Idaho fescue, green needlegrass, basin wildrye, needleandthread, native legumes, big sagebrush, sticky geranium, prairiesmoke



29 Silty-Clayey Range Site Complex, 10-14" P.Z.

Silty: Same as Site No. 27

Clayey: Same as Site No. 31

30 Silty-Clayey Range Site Complex, 15-19" P.Z.

Silty: Same as Site No. 28

Clayey: Same as Site No. 32

31 Clayey and Shallow Clay Range Site Association, 10-14" P.Z.

Western and thickspike wheatgrass, bluebunch wheatgrass, green needlegrass, big sagebrush, prairie junegrass, plains reedgrass, prairie sandreed, milkvetches

32 Clayey and Shallow Clay Range Site Association, 15-19" P.Z.

Bluebunch wheatgrass, Columbia and green needlegrass, Idaho fescue, basin wildrye, big sagebrush, western and thickspike wheatgrass, prairie junegrass, prairie sandreed, lupine, other native legumes, sticky geranium, prairiesmoke

33 Dense Clay-Clayey-Saline Upland Range Site Complex, 5-9" P.Z.

Dense Clay: western and thickspike wheatgrass, inland saltgrass, Nuttall saltbush, big sagebrush, black sagebrush, bud sagebrush, shadscale saltbush, greasewood, Sandberg bluegrass, prairie junegrass

Clayey: western and thickspike wheatgrass, bluebunch wheatgrass, prairie junegrass, plains reedgrass, big sagebrush, bud sagebrush, milkvetches, winterfat, blue grama

Saline Upland: Alkali sacaton, western and thickspike wheatgrass, greasewood, Nuttall saltbush, shadscale saltbush, fourwing saltbush, inland saltgrass, big sagebrush, bottlebrush squirreltail, Sandberg bluegrass

34 Dense Clay-Clayey-Saline Upland Range Site Complex, 10-14" P.Z.

Dense Clay: western and thickspike wheatgrass, green needlegrass, inland saltgrass, big sagebrush, Nuttall saltbush, greasewood, prairie junegrass, Sandberg bluegrass

Clayey: Same as Site No. 31

Saline Upland: Alkali sacaton, western and thickspike wheatgrass, greasewood, Nuttall saltbush, basin wildrye, inland saltgrass, big sagebrush, bottlebrush squirreltail

35 Riverbreaks, 10-14" P.Z.

Ponderosa pine, Rocky Mountain juniper, Douglas-fir (north slopes), bluebunch wheatgrass, western and thickspike wheatgrass, green needlegrass, prairie sandreed, basin wildrye, needleandthread, greasewood, big sagebrush, creeping juniper, native legumes, prairie junegrass

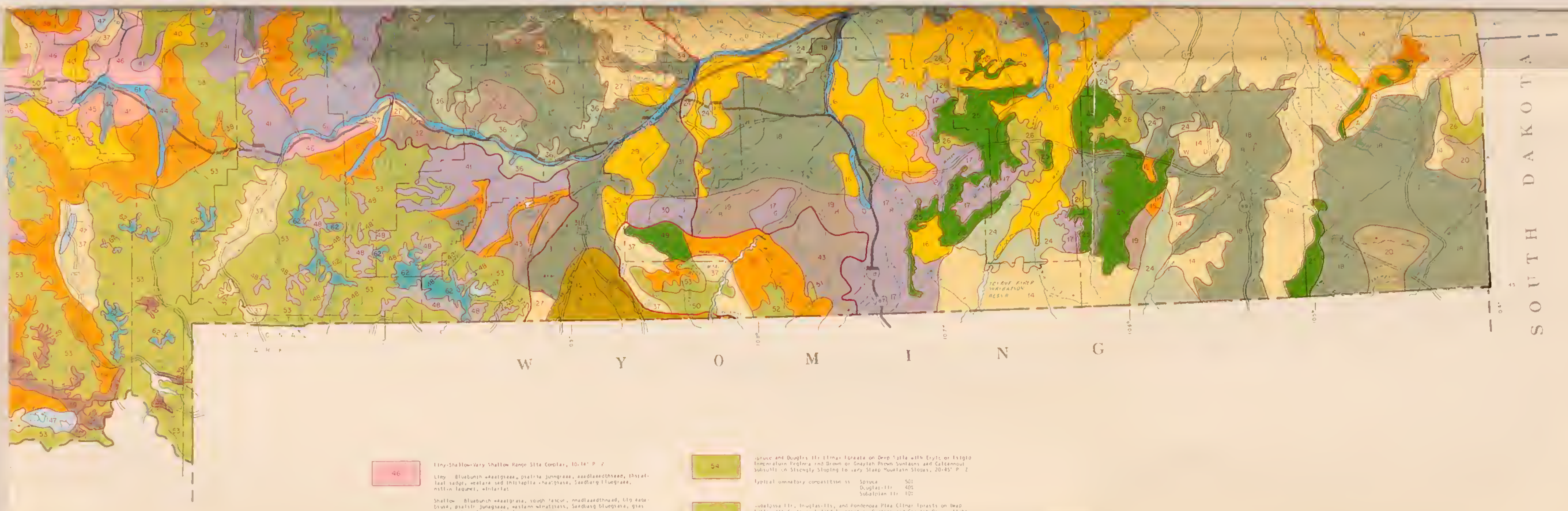
36 Forest-Grassland Complex, 12-14" P.Z., on Very Shallow to Deep Soils with Frigid Temperature Regimes and Light Brown, Loamy Surfaces on Rolling to Steep Terrain

Forest (50%) Ponderosa pine, Rocky Mountain juniper, bluebunch wheatgrass, western wheatgrass, skunkbush sumac, snowberry, needleandthread

Grassland (50%) Bluebunch wheatgrass, needleandthread, western and thickspike wheatgrass, green needlegrass, big sagebrush, prairie sandreed, native legumes, prairie junegrass

Source:
Base map prepared by SCS, Portland Carto Unit.
Thematic detail compiled by Montana State Staff.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE



FOOTHILL AND MOUNTAIN

37 Silty Range Site, 10-14" P.Z.

Bluebunch wheatgrass, rough fescue*, needleandthread, prairie junegrass, western and thickspike wheatgrass, green needlegrass, basin wildrye, threadleaf sedge, native legumes, big sagebrush, winterfat, Idaho fescue

*Codominant with bluebunch wheatgrass west of the Continental Divide but insignificant on east side at this P.Z.

38 Silty Range Site, 15-19" P.Z.

Rough fescue, Idaho fescue, bluebunch wheatgrass, Columbia needlegrass, basin wildrye, spike fescue, parry danthonia, slender wheatgrass, lupine, sticky geranium, arrowleaf balsamroot, prairie smoke, big sagebrush, tall larkspur, prairie junegrass, timber danthonia, big bluegrass

39 Silty Range Site, 20-24" P.Z.

Rough fescue, Columbia needlegrass, Richardson needlegrass, mountain brome, bearded wheatgrass, slender wheatgrass, basin wildrye, Idaho fescue, lupine, sticky geranium, prairiesmoke, tall larkspur, big sagebrush, spike fescue, sticky trisetum, purple oniongrass, nodding brome, quaking aspen, American bistort

40 Silty-Clayey Range Site Complex, 10-14" P.Z.

Silty — Same as Site No. 37

Clayey — Same as Site No. [illegible]

41 Silty-Clayey Range Site Complex, 15-19" P.Z.

Silty — Same as Site No. 38

Clayey — Same as Site No. 43

42 Clayey and Shallow Clay Range Site Association, 10-14" P.Z.

Bluebunch wheatgrass, western wheatgrass, green needlegrass, basin wildrye, prairie junegrass, plains reedgrass, big sagebrush, [illegible], American vetch, bitterroot

43 Clayey and Shallow Clay Range Site Association, 15-19" P.Z.

Rough fescue (except south central Montana), bluebunch wheatgrass, Columbia needlegrass, western and thickspike wheatgrass, Idaho fescue, basin wildrye, lupine, sticky geranium, arrowleaf balsamroot, big sagebrush, prairiesmoke, prairie junegrass, deathcamas

44 Saline Lowland Range Site, 10-14" P.Z.

Basin wildrye, alkali sacaton, Nuttall alkaligrass, alkali cordgrass, slender wheatgrass, western wheatgrass, inland saltgrass, greasewood, silver buffaloberry

45 Sands and Sandy Range Site Association, 10-14" P.Z.

Sands — Prairie sandreed, needleandthread, Indian ricegrass, bluebunch wheatgrass, threadleaf sedge, native legumes, [illegible], yucca

Sandy — Needleandthread, bluebunch wheatgrass, native legumes, threadleaf sedge, big sagebrush, prairie junegrass, skunkbush sumac

46 Limy-Shallow-Very Shallow Range Site Complex, 10-14" P.Z.

Limy — Bluebunch wheatgrass, prairie junegrass, needleandthread, threadleaf sedge, western and thickspike wheatgrass, Sandberg bluegrass, native legumes, winterfat

Shallow — Bluebunch wheatgrass, rough fescue, needleandthread, big sagebrush, prairie junegrass, western wheatgrass, Sandberg bluegrass, gray horsebrush, phlox, native legumes

Very Shallow — Bluebunch wheatgrass, prairie junegrass, western wheatgrass, threadleaf sedge, phlox, needleandthread, Sandberg bluegrass, native legumes - mountain mahogany, limber pine, antelope bitterbrush, big sagebrush, and Rocky Mountain juniper in cracks and crevices of bedrock

47 Subirrigated and Wetland Range Site Association

Tall reedgrasses, tufted hairgrass, American mannagrass, tall sedges, slender wheatgrass, bearded wheatgrass, basin wildrye, willows, shrubby cinquefoil, prairie cordgrass, elephanthead pedicularis, monkeyflower, native clovers, Indianpaintbrush, common blue-eyedgrass

48 Alpine Grassland on Deep to Moderately Deep, Well Drained to Poorly Drained Soils with Cryic Temperature Regimes and Dark Brown and Very Dark Brown Surfaces on Sloping to Steep Windswept Mountain Tops Above Timberline, 40-70" P.Z.

Tufted hairgrass, sedges, sheep fescue, alpine bluegrass, alpine timothy, native legumes, wolf willow, red mountainheath, white dryad, alpine bluebell, bluejoint, purple reedgrass, moss silene, yellow avens, tufted phlox, eriogonum, American bistort, shrubby cinquefoil

49 Forest-Grassland Complex, 15-19" P.Z., on Shallow to Moderately Deep Soils with a Frigid Temperature Regime and Brown to Dark Brown Surfaces under Grassland and Brown to Gray Surfaces under Forest on Sloping to Steep Terrain

Forest (60%) Douglas-fir, common snowberry, white spirea, pinegrass, heartleaf arnica, Columbia needlegrass, Idaho fescue, bearded wheatgrass, kinnikinnick

Grassland (40%) Bluebunch wheatgrass, Idaho fescue, Columbia needlegrass, basin wildrye, spike fescue, lupine, arrowleaf balsamroot

50 Rocky Mountain Juniper and Limber Pine in Shallow Soils with a Frigid Temperature Regime and Dark Grayish Brown Surfaces Developed from Limestone or Calcareous Sandstone Residuum on Moderately Steep to Very Steep Mountain Slopes - Rock Outcrop 40-70%, 10-14" P.Z.

Typical overstory composition is		
	Rocky Mountain juniper	90%
	Limber pine	10%

51 Douglas-fir and Ponderosa Pine Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes and Light Brownish Gray, Brown, or Grayish Brown Surfaces on Hilly to Steep Mountain Slopes, 16-22" P.Z.

Typical overstory composition is		
	Douglas-fir	60%
	Ponderosa pine	40%

52 Subalpine fir, Douglas-fir, and Ponderosa Pine Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes and Grayish Brown, Light Brownish Gray, or Light Yellowish Brown Surfaces on Moderately Steep to Very Steep Mountain Slopes East of the Continental Divide, 15-35" P.Z.

Typical overstory composition is		
	Subalpine fir	50%
	Douglas-fir	35%
	Ponderosa pine	10%
	Engelmann spruce	5%

53 Subalpine fir and Douglas-fir Climax Forests on Deep Soils with Cryic Temperature Regimes and Pale Brown or Light Brownish Gray Surfaces on Moderately Steep to Very Steep Mountain Slopes, 20-45" P.Z.

Typical overstory composition is		
	Subalpine fir	65%
	Douglas-fir	25%
	Engelmann spruce	10%

54 Spruce and Douglas-fir Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes and Brown or Grayish Brown Surfaces and Calcareous Subsoils on Strongly Sloping to Very Steep Mountain Slopes, 20-45" P.Z.

Typical overstory composition is		
	Spruce	50%
	Douglas-fir	40%
	Subalpine fir	10%

55 Subalpine fir, Douglas-fir, and Ponderosa Pine Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes and Grayish Brown, Light Brownish Gray, or Light Yellowish Brown Surfaces on Moderately Steep to Very Steep Mountain Slopes West of the Continental Divide, 16-70" P.Z.

Typical overstory composition is		
	Subalpine fir	50%
	Douglas-fir	35%
	Ponderosa pine	10%
	Engelmann spruce	5%

56 Douglas-fir Climax Forests on Deep Soils with a Frigid Temperature Regime and Light Gray Surfaces and Calcareous Subsoils on Gently Rolling to Hilly Mountain Foot Slopes and Strongly Sloping to Steep Mountain Slopes, 16-30" P.Z.

Typical overstory composition is		
	Douglas-fir	90%
	Grand fir	10%

57 Subalpine fir, Douglas-fir, and Grand fir Climax Forests on Deep Soils with Cryic or Frigid Temperature Regimes and Light Gray or Pale Brown Surfaces on Steep to Very Steep Mountain Slopes, 30-70" P.Z.

Typical overstory composition is		
	Subalpine fir	55%
	Douglas-fir	35%
	Grand fir	10%

58 Western Redcedar and Western Hemlock Climax Forests on Deep Soils with Frigid Temperature Regimes and Brown to Pale Brown or Light Gray Surfaces on Gently Sloping to Gently Rolling Valley Floors, 20-35" P.Z.

Typical overstory composition is		
	Western redcedar	70%
	Western hemlock	15%
	Grand fir	15%

59 Grand fir and Douglas-fir Climax Forests on Deep Soils with Frigid Temperature Regimes and Pale Brown or Light Gray Surfaces on Steep to Very Steep Mountain Slopes, 25-60" P.Z.

Typical overstory composition is		
	Grand fir	45%
	Douglas-fir	45%
	Western redcedar & western hemlock	10%

60 Subalpine fir Climax Forests on Deep Soils with Cryic Temperature Regimes and Brown or Strong Brown Surfaces on Steep to Very Steep Mountain Slopes, 60-100" P.Z.

Typical overstory composition is		
	Subalpine fir	70%
	Mountain hemlock	20%
	Douglas-fir	10%

61 Hardwood Climax Forests on Alluvial Floodplains Along Major Rivers and Growing on Shallow to Deep, Well Drained to Poorly Drained Soils with Frigid Temperature Regimes

Typical overstory composition is:

East of Continental Divide	Cottonwood	80%
	Other hardwoods	20%
West of Continental Divide	Cottonwood	80%
	Conifers	20%

62 Rockland and Mixed High Elevation Vegetation Consisting of Forests, Krummholz, and Alpine Tundra Growing on Shallow to Deep, Very Gravelly or Very Cobbly, and Stony Soils with Cryic Temperature Regimes, 40-110" P.Z.

Typical composition is		
	Rockland	70%
	Vegetation	30%

CLIMAX VEGETATION

MONTANA

JULY 1976

10 0 10 20 30 40 MILES

SCALE 1:1,000,000

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